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Worldwide Report

ENVIRONMENTAL QUALITY

No. 240

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WEST EUROPE

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GREECE

AUSTRALIAN ENVIRONMENTAL COUNCIL ASSESSES POLLUTION DANGERS

Brisbane THE COURIER-MAIL in English 7 Dec 79 p 9

[Text] Wellington, N.Z.(AAP).--The Australian Environment Council has agreed to fund a $100,000 research and studies programme dealing with hazardous chemicals, industry pollution costs, oil spillages and clear forest felling.

Following its meeting in Wellington the council said it considered air pollution an "important environmental problem" in Australia's cities.

The council meeting, the eleventh to be held, was convened at the invitation of the New Zealand Environment Minister (Mr. Young).

The council comprises Australian State and Federal Ministers for the Environment. It was chaired by the Victorian Minister for Conservation (Mr. Houghton).

The council also established a committee to investigate a uniform approach to litter control throughout Australia.

The Ministers called for "optimum" motor vehicle emission controls.

They said this would result in motor vehicles which were both fuel efficient and environmentally acceptable.

The decision seemingly supports the case of New South Wales for insisting on the introduction of more stringent emission controls on motor vehicles next year.

The Federal Government and some States have resisted New South Wales proposals in the past.

Support

The New South Wales Planning and Environment Minister (Mr. Landa) said last night: "The decision of the council supports the case I have been making for a number of years.

"This is why the NSW Government has continued with its programme of emission controls."

The council also noted that technologies developed in the U.S. and Japan on lead-free petrol had reduced petrol consumption in motor vehicles.

The council had a lengthy discussion on lead-free petrol and catalytic emission control converters.

Mr. Landa said there was no doubt this technology could be adapted to Australia.

CSO: 5000

AUSTRALIA

VICTORIAN HEALTH COMMISSION URGES LEAD LEVEL REDUCTION

Melbourne THE AGE in English 13 Dec 79 p 5

/Article by Bruce Best/

[Text] The Victorian Health Commission wants to water down new standards proposed for measuring the levels of lead and other pollutants in the atmosphere.

It has suggested ways of determining lead levels which would produce lower readings and "take some heat out of" the controversy over pollution.

The suggestions were made in Health Commission comments on a draft policy for protecting Victoria's air.

The Opposition spokesman on conservation, Mr. Walker, quoted from the report in State Parliament yesterday, after it had been anonymously sent to him.

The head of the industrial hygiene section, Dr. Allan Christophers, confirmed last night that the document had been prepared in his section of the Health Commission.

The report said officers of the section had been "entirely unimpressed" by studies on the effect of lead on children's mental ability and behavior.

"The agitation against lead is being vigorously promoted by influential groups opposing freeways and this movement is already receiving considerable support from several municipal councils," it said.

"A situation where the acceptable level for lead is known to be exceeded within proviate residential properties will be politically explosive."

The report suggested that increasing the period of time over which lead levels were averaged would give a reading "considerably lower" than the highest level for any one month.

Alternatively, it said, the area of air in which pollution was measured should be determined more carefully to give lower readings.

If this were done "it could be confidently asserted that the proposed (lead) level had not been exceeded on any occasion in the past and would not be exceeded on any occasion in the near future."

This would "take a lot of heat out of a potentially explosive situation "but still mean lead levels could be exceeded in homes near busy roads.

"It could rightly be argued that these residents were entitle to the same consideration as that given to the community at large," the report said.

In Parliament, Mr. Walker criticised the Health Commission because of what he called its preoccupation with protecting the community's economic health rather than its physical health.

Major pollutants had been considered in economic terms and proposed acceptable levels of photochemical oxidants had been rejected because they would be economically disruptive.

The commission seemed to believe that complete proof of health risk was needed before limits were accepted on pollution levels.

The Minister for Conservation, Mr Houghton, said he was not aware of the Health Commission document.

But it was not appropriate to suggest an inquiry by the Minister into the industrial hygiene section, he said.

Mr Houghton defended Dr Christophers as a most competent and able scientist and as a realist.

CSO: 5000

HERBICIDE 2,4,5-T REPORTED TO ENDANGER CITIZENS' HEALTH

Monash University Experiments

Melbourne THE AGE in English 6 Dec 79 p 3

/Article by Philip McIntosh/

[Text] Researchers at Monash University have found evidence that the herbicide 2,4,5-T interferes with the nervous system of test animals.

They said yesterday the evidence suggested there was a potential risk to unborn babies and that pregnant women should not be exposed to the chemical.

Dr. Lesley Rogers and Ms. Christine Sanderson found that chickens injected with 2,4,5-T during incubation showed behavioral changes after birth.

They showed increased activity and fear and a tendency towards retarded learning.

Chicks injected with 2,4,5-T two days after birth also demonstrated more sexual activity than control birds.

Dr. Rogers, a research fellow in the department of pharmacology, and Ms Sanderson, an honors student, said that at the recommended spraying rate, the amount falling on the egg would be five times the level at which they observed behavioral effects.

They said the effects were produced at lower doses than the levels at which physical deformities had been produced in their and other experiments.

At higher doses, a small percentage of the chicks showed some form of abnoraml leg position but this did not ocur in any of the controls.

Dr. Rogers said this effect was not dose related. As the dose of 2, 4, 5-T was reduced, fewer birds were affected, but those which were affected had an extreme form of the defect.

"This indicates that sensitivity to the chemical varies within the species," she said.

Dr. Rogers said day 15 of incubation was found to be the time of greatest sensitivity to the herbicide.

Chicks injected with 26.5 milligrams of 2, 4, 5-T per kilogram body weight at this time were much more active and afraid two weeks after birth than controls.

Injection at this time also had the greatest retarding effect upon the chicks' ability to learn.

Since March this year 2, 4, 5-T has been subject to State Government advice that it should not be used in populated areas.

Threat in Blue Mountains

Sydney THE SYDNEY MORNING HERALD in English 6 Dec 79 p 7

[Article by Graeme Brooks: "The People Versus 2,4,5-T"]

[Text]

COREOPSIS LANCEOLATA is the small golden flower on the long green stem that grows profusely by the roadside, flourishes on dreary railway embankments and pops up along the pavement.

In the Blue Mountains, at this time of year, coreopsis blooms are everywhere.

Anne Gingis was standing near Hazelbrook Station, waiting for a friend, when a Public Transport Commission weed-eradication team sprayed milky-white liquid all over the golden coreopsis and the other tangled growth on the station embankment.

The breeze carried the spray towards her.

It was 2,4,5-T.

Within a few minutes, Mrs Gingis said she felt sick, short of breath and dizzy.

A urine analysis showed that she had absorbed a concentration of 70 parts per million 2,4,5-T. Workers who constantly spray the chemical usually have a concentration of approximately 50 parts per million. The maximum recommended dose is 100 parts per million.

Mrs Gingis says her symptoms continued for some weeks. She was breast-feeding at the time.

Her story is only one of many stories of contamination and unexplained illness that Blue Mountains residents tell.

The debate about herbicide use has raged in the area for two years. Last week, the Blue Mountains City Council suspended the use of 2,4,5-T for the third time.

This time, suspension followed a petition to council signed by more than 30 doctors who practise in the area.

Every doctor in Katoomba signed the petition. One, who does not wish to be named for ethical reasons, says he is concerned by clusters of rare cancers occurring with unusual frequency in the Blue Mountains area.

"They are cancers that you would not see over a number of years, even in a large city teaching hospital. Yet you come up here and you see several all in the same small area."

According to the doctor, there are other odd health problems: "People come to the surgery with non-specific, subjective-diagnosis complaints: dizziness, coughs that don't clear up, lethargy. You see them one after the other and, later, you realise that they all come from the same street.

"That is not scientific evidence. It is anecdotal evidence. But I feel it is evidence which justifies further research."

The NSW State Cancer Council's Carcinogenisis Committee is examining submissions from the Blue Mountains.

Its findings, if they are published, will add to a long list of scientific studies prompted by concern about the use of 245-T. Research papers on the herbicide are as numerous as the weeds it is meant to control.

Blue Mountains residents believe that the monitoring process and its results should be matters for public scrutiny.

They have also asked that residents be informed of proposed herbicide spraying in their areas. The council says that this would be too difficult.

In the Medical Journal of Australia in June this year, Dr Charles Lee wrote that women of child-bearing age should be protected from TCDD, "just as they are protected from therapeutic drugs when there is evidence of animal teratogenicity" (birth defects). Dr Lee is a consultant physician in pedaetrics at the Roval Alexandra Hospital for Children.

The Mayor of the Blue Mountains, Alderman Ernest Lesslie, says that if the council has to change its financial priorities in order to maintain the ban on 2,4,5-T, it will do so.

"This time, we will wait to get all the facts on this matter before we make a judgment. As things stand now with 2,4,5-T, all the facts are not yet to hand."

One council employee in the weed control section was not so cautious: "If you spray anything around here, people rush off to their doctor because they think it's 2,4,5-T.

"I think we should spray the whole place with milk and water, and then just see how many people get sick."

To date, most studies have concluded that there is no causal link between correctly used 2,4,5-T and health problems.

There is evidence which proves that a contaminant which is always present in 2,4,5-T is highly toxic.

The contaminant, TCDD, is one of the dioxins — the substance that caused extensive illness in Seveso, Italy, and at Love Canal in the United States.

In animal tests, TCDD has cause spontaneous abortion, birth abnormalities and cancer.

In Australia, the maximum allowable concentration of TCDD in 2,4,5-T is 0.1 part per million.

Before June this year, TCDD concentrations sometimes exceeded that amount in samples of 2,4,5-T tested by Government authorities.

A spokesman for the Department of Primary Industry said that information regarding the amounts by which dioxin levels were exceeded is confidential. He said that the amounts did not constitute cause for alarm.

Since June, 1979, the Department of Primary Industry has carried out regular monthly residue surveys of random samples of 2,4,5-T. In the first five months of the new surveys, dioxin levels have not exceeded 0.1 parts per million in the samples tested.

The department's spokesman was not prepared to comment on the amounts of 245-T sampled in each State.

Minister Urges Alternative

Sydney THE SYDNEY MORNING HERALD in English 7 Dec 79 p 2

[Text]

The NSW Minister for Transport Mr Cox, told the PTC yesterday to seek urgently an alternative spray to 2,4,5-T for use against weeds.

A contractor employed by the PTC has been using the controversial herbicide against infestations of blackberries and St John's wort along the western line.

In a report in yesterday's Herald a Hazelbrook resident complained of illness after being covered with 2, 4, 5-T fumes after a railway was sprayed.

The report dealt with medical concern over the abnormal incidence of rare cancers in the Blue Mountains, and a petition by every doctor in the Katoomba area which led to a renewed council ban on the use of 2, 4, 5-T.

Mr Cox emphasised that the weed control teams had been told not to spray a yellow flower, commonly called calliopsis, which turns many of the State's railways into ribbons of yellow blossoms at this time of year.

But the weeds and the flowers sometimes grew on the same stretch of line, he said.

He was not convinced that 2,4,5-T was safe to use along railway tracks, particularly those carrying heavy passenger loads or passing near homes.

"I have told the PTC that the contractors should be directed to explore other alternatives to the herbicide which has been the cause of worldwide concern," he said.

CSO: 5000

CONTROVERSY OVER EFFECTS OF SAND MINING CONTINUES

Minister Predicts Increase

Brisbane THE COURIER-MAIL in English 3 Dec 79 p 10

[Text] The Mines Minister (Mr. Camm) yesterday forecast a significant increase in sand mining operations next year.

There was no doubt 1979 would be a record year for mineral production, he said, and the most significant growth areas were in base metals and mineral sands.

Attacks on the sand mining industry by conservation groups had damaged the mining industry as a whole by damaging Australia's reputation as a resource supplier, Mr. Camm said.

"As this type of mining involves operations on or near our beach areas, there is bound to be another storm of protest," he said.

"However, the conditions we impose on the companies to carry out reclamation work ensure that the beach areas are protected and, in many cases, made more secure and stable than before mining took place.

"The sand mining industry has in the past often been singled out for criticism, but no section of the mining industry can be attacked without it having an adverse effect on the industry as a whole."

Mr. Camm said areas on Fraser Island which were mined and then restored now had lush vegetation and had suffered no erosion as a result of mining.

Queensland Backbencher's Remarks

Brisbane THE COURIER-MAIL in English 6 Dec 79 p 15

[Text] A Liberal backbencher yesterday expressed concern in State Parliament over the State Government's intentions on sand mining.

Mr. Innes (Lib., Sherwood), who spoke during the public interest debate, said the areas involved were the Cooloola National Park and Moreton Island.

He said a report in a Gympie newspaper yesterday had indicated the Mines Department was considering calling applications for mining leases in a State Forestry section of the Cooloola National Park.

Mr. Innes said the report erred in that 'the State Forest was not included in the national park, but it was recognised as an integral part of the Cooloola area.

'Manoeuvring'

It seemed at least one Government department was prepared to consider action which would cut across recommendations of a management plan prepared for the area.

Mr. Innes said he hoped the Mines Minister (Mr. Camm) could deny this.

About Moreton Island, Mr. Innes said there was "manoeuvring" going on over the island's future.

There had been suggestions that the Government was considering moving away from recommendations in the Cook Report which called for sand mining on 6.4 per cent of the island.

The report had stipulated that such mining be confined to certain areas.

He said one company, Mineral Deposits, was seeking to expand its area on the island.

Mr. Innes said he hoped the Government would abide by the Cook Reports recommendations.

Fraser Island 'Recovered'

Brisbane THE COURIER-MAIL in English 15 Dec 79 p 2

[Text] Canberra.--Rehabilitation after sand mining on Fraser Island has been successful and requires no further work, according to ecologist Dr. John W. Lewis.

Writing in the latest edition of Mining Review three years after mining on the island ceased, Dr. Lewis said the natural processes which formed Fraser Island and made it what is is today would "act inexorably on the mined areas to blend them gradually into the whole mosaic of the island."

Dr. Lewis, who works for Mineral Deposits Ltd. reviewed the history of mining on the island and described the progress of rehabilitation on the mined areas in the Review.

Commenting on the article, the Australian Mining Industry Council executive director (Mr. G. Paul Phillips) said the industry had always held to the view that contrary to the findings of the Hookey inquiry, rehabilitation on the island would be successful.

"In the light of the progress on Fraser Island rehabilitation, the decision to prohibit mineral sand exports from that area on environmental grounds should be reviewed," he said.

CSO: 5000

BRIEFS

FLUORIDE-CANCER LINK--A study of 20 localities in New South Wales has found no relationship between cancer deaths and fluoridated water supplies. The study was done by two researchers at the central cancer registry of the NSW Health Commission because of controversy over fluoridation. Mr. Geoffrey Richards, a research officer, and Dr. Joyce Ford, the cancer registrar, reported their study in the "Medical Journal of Australia". Mr. Richards and Dr. Ford calculated standardised death ratios for 10 localities with fluoridated water and 10 without, discounting for the effect of ageing which is a significant factor in cancer death rates. They found that standardised death ratios for cancer were not higher in fluoridated areas than in non-fluoridated areas. Yass, with the earliest recorded fluoridation scheme in NSW, had a lower SDR than Gosford (non-fluoridated). [Excerpts] [Melbourne THE AGE in English 3 Dec 79 p 4]

MURRAY RIVER PLAN--Adelaide: A $122.87 million plan that would tackle urgent River Murray salinity and drainage problems on a coordinated national basis was unveiled in Adelaide yesterday. The plan, resulting from a study by consulting engineers Maunsell and Partners, includes a provision of $4.52 million for research into salinity and measures introduced to counter it during the first five years of the proposed project. The study was commissioned by the Commonwealth, SA, NSW and Victorian governments in 1977. It recommends the expenditure of $75.24 million over five years and additional $47.63 million over a further 20 years. About 31 per cent of the total would be spent on SA-based projects. The recommended expenditures in the first five years include: drainage works, $41.42 million; saline ground-water interception and disposal works, $18.33 million; on-farm measures to improve irrigation practices, $10.97 million; monitoring and investigation into the effectiveness of these measures, $2.83 million; research into salinity, $1.69 million. [Excerpts] [Perth THE WEST AUSTRALIAN in English 8 Dec 79 p 5]

CSO: 5000

DECISION ON KERALA'S SILENT VALLEY HYDROELECTRIC PROJECT EXPECTED

Calcutta THE SUNDAY STATESMAN in English 20 Jan 80 p 6

[Editorial: "Poison Around Us"]

[Text] Mrs Gandhi's Government will soon have to take a decision on Keraia's controversial Silent Valley hydroelectric project. Work began after the local High Court's recent rejection of writ petitions against a scheme which will inevitably destroy an important rain forest, home of the rare lion-tailed monkey. But the Centre ordered cessation of activities until new Ministries in New Delhi, as well as in Trivandrum, had an opportunity of assessing the feared ecological damage. The chairman of the Kerala State Electricity Board, who is anxious to get on with the project, dismisses protests as "inspired." Others argue that a scheme to irrigate paddy fields and generate 120 megawatts of power cannot be shelved at this late stage merely because of objections by environmentalists. Their case is strengthened by the State Government's creation of a board to "monitor" the impact of the scheme and to ensure that damage to rare species of flora and fauna is kept to a minimum. But scientists and ecologists, including the International Union for the Conservation of Nature and Natural Resources, claim that disturbance will be irreversible and incalculable, and that the nature of the scheme does not allow for effective "safeguards." Believing this, two eminent non-officials, Dr Madhav Gadgil and Mr Zafar Futehally, have already declined to serve on the board of monitors.

When the Prime Minister's opinion was sought in Trivandrum recently, she temporized by promising that her Government would investigate whether the project's benefits could not be obtained without disturbing the Silent Valley's ecological balance. But it is precisely this kind of equivocation which has led to the systematic and increasing pollution of all our waterways, in spite of preventive legislation enacted in 1974. A Central Board for Preservation and Control of Water Pollution was set up at the same time, with branch organizations in all States, but to very little effect. It may be difficult to cope with special abuses like putrefying bodies in Tolly's Nullah, animal carcases in the Hooghly or faecal matter in drinking water supplied at stations on the North-eastern Railway. But it is distressing,

to say the least, that only eight out of 142 major cities boast effective sewage systems and treatment facilities, while 62 have partial arrangements, and 72 none at all. Little wonder that 80 percent of India's water pollution is believed to be caused by sullage.

Industry is just as bad. The effect on the Taj Mahal of the Mathura oil refinery has already caused worldwide concern. Other historical monuments, and wild life reserves, are also in peril. Reports indicate that the Damodar has turned black because of factory effluent, while the Chaliyar river in Kerala is now brown. A high level of mercury has been found in Bombay's Thane creek and in the Rushkulya in Orissa, while the water supply to several Rajasthan towns is believed to be contaminated. Madhya Pradesh fares worst, with most industrial establishments, apparently, ignoring with impunity notices to set up waste treatment plants. The Kota thermal station, for instance, is expected substantially to increase the Chambal river's sulphate and chloride content and to scatter ash over a five-mile radius. Such monstrosities are tolerated because of the belief, also evident in the Silent Valley Project, that concessions to ecology will retard economic growth. That Kerala is already surplus in power is not regarded as a valid objection, since the excess will probably be fed into a regional grid. But experience in the West should have taught Indian planners that, in the long run, countries have to pay a high price for unthinking encroachments on nature.

CSO: 5000

MAN-MADE RADIOACTIVE SUBSTANCE FOUND NEAR POWER PLANTS

Shellfish Contaminated

Tokyo KYODO in English no time given 28 Jan 80 OW

[Text] Fukushima Jan 28 KYODO--Cobalt-60, a man-made radioactive substance, has been found in shellfish off a complex of nuclear power plants on the Pacific coast.

A group of nuclear experts made the disclosure on the basis of its own survey at the prefectural government office here Monday.

The group was headed by Kenya Mizuguchi, assistant professor at Tokyo University of Fisheries.

The recorded traces of cobalt-60 were of low density, but since the nuclear complex fronts the ocean which is supposed to disperse waste water from the power plants, the traces were virtually one of the highest ever confirmed, experts noted.

Cobalt-60 has been detected in bays in Fukui and Shimane prefectures where such facilities are located, but this was the first traces found in the ocean.

The experts urged the prefectural government to take countermeasures before the situation assumes more serious proportions.

The group monitored the radioactivity in undersea silt and shellfish near the two waste water outlets of the nuclear complex in collaboration with a fisheries cooperative of Namie town for one year ended in June 1979.

As a result, four to 13 pico curies of cobalt-60 was detected in the flesh of surf clams per one-kilogram weight collected from a location about 800 meters from the south outlet.

Another kind of shellfish registered 188 pico curies.

The experts said local fishermen pointed to the detection of cobalt-60 in the seabed soil and damage to shellfish in neighboring sea areas in 1977, but the prefectural authorities had neglected the warning.

More precise and wider checks may probably prove greater contamination of the sea water and marine products from waste water discharged from the complex, the experts said.

At the complex, Tokyo Electric Power Co. operates six nuclear reactors with a combined generation capacity of about 4.7 million kilowatts--one of the largest N-power complexes in the world.

The utility plans to build four more generators at a place about 12 kilometers south of the present complex to generate an extra 4.4 million kilowatts.

Tokyo Electric Power official said that the water used to wash workclothes of reactor workers may have been discharged, and that his company is now building a plant to filter the waste to be completed in two years.

Cobalt-60 Confirmed

Tokyo KYODO in English no time given 28 Jan 80 PW

[Text] Tokyo Jan 27 KYODO--A collegiate research group has found that cobalt-60 increased nearly six times in the past year in submarine mud around an overflow of hot waste water discharged from Kansai Electric Power Co's Takahama nuclear power plant in Fukui Prefecture.

The research on radioactivity in Uchiura Bay facing the N-power plant's No 1 and No 2 reactors has been made every year since 1972 by the fishery damage research group consisting of faculty members and students at Kyoto University with the help of a local fishermen's cooperative association.

The group has detected 0.289 picocurie of cobalt-60, an artificial radioactive substance, from one gram of dried submarine mud gathered around the overflow in July 1979. The figure showed an increase of nearly six times from 0.050 picocurie in July 1978.

The result of the research showed that the radioactive contamination was steadily spreading throughout Uchiura Bay, the group said.

The group detected cobalt-60 at nine points out of 12 including three points where cobalt-60 was detected a year ago.

The group believes cobalt-60 was detected from mud in front of the overflow because the mud was gathered when the reactors were under regular inspection during which period the waste water was discharged from the reactor containers into the sea in a weak flow.

The group warned against further contamination of the sea and air if the N-power plant continues operation in the future.

The Fukui Prefectural Government has been also making similar research every three months, detecting 0.01 to 0.04 picocurie of cobalt-60 from dried submarine mud around the overflow between April 1978 and May 1979. The local government has not yet announced the result of the July 1979 research.

An official of the International Trade and Industry Ministry said even if the group's research data were correct, the figures were out of the question in view of the government's limit on radioactive substance in waste water discharged from N-power plants at set "not higher than one curie."

However, Sadao Ickikawa, professor of genetics at Saitama University, claimed that radioactive substance whatever the quantity has some dangerous effect on human bodies.

CSO: 5000

CURRENT AIR POLLUTION SITUATION DESCRIBED

Warsaw AURA in Polish No 11, Nov 79 p 1

[Article: "More and More Dust and Gases in the Air"]

[Text] In the previous issue we discussed the results of surveys and tests conducted in 1978 which concerned water pollution control. Today, we present the air pollution control situation.

In 1978, 931 plants known as the most burdensome on the atmosphere comprised the balance of air pollutants. In spite of a considerable increase--about 10 percent from 1977--in the amount of dust removed by dust extractors in 1978, a rise in dust emissions of 137,900 tons occurred, which represents a 5.4 percent increase. The main reason for the rise in dust emissions is the introduction of new production flowlines, the use of fuels that are inconsistent with the parameters defined in technical-motor documentation pertaining to boilers, as well as the abnormal use and susceptibility to accidents of dust extractors.

The greatest increase in dust emissions compared with 1977 occurred in the Jelenia Gora, Warsaw, Tarnobrzeg, Bydgoszcz and Chelm voivodeships. A fall in dust emissions took place in 17 voivodeships, the greatest in Sieradz, Ostroleka, Kielce, Katowice and Gorzow Wielkopolski.

Last year, a further increase in sulphur dioxide emissions of 7.8 percent was noted (from 2,337,300 tons in 1977 to 2,519,900 tons in 1978). In this case, the reasons for the increase in emissions are the activation of new production flowlines, an intensification of production and the use of fuels with a higher sulphur content. This situation has been observed above all in the Katowice, Plock, Legnica and Szczecin voivodeships.

A decrease in sulphur dioxide last year occurred in 19 voivodeships, particularly in Krakow (a sulphur recovery plant for coking gas was put into operation at the Lenin Huta, and coal with a lower sulphur content

was used at the Skawina Electric Power Plant), as well as Jelenia Gora where better quality coal was introduced at the Turow Electric Power Plant. Fallout measurements were conducted in 41 voivodeships, at 2,413 test points which were located in the area of industrial plants, in protected zones as well as preserved and specially preserved places.

Fallout measurements were conducted in 37 voivodeships, most intensively in Krakow, Kielce and Katowice; they continued to be unrealized in the Chelm, Ciechanow, Przemysl and Siedlce voivodeships.

Last year, local environmental protection services completed 1,978 emission measurements within the framework of inspection activity, and 1,854 measurements by order of the plants. Decisions were handed down defining permissible emissions for 476 existing plants (31 percent higher than in 1977), as well as 3,093 accords defining permissible emissions for newly planned plants.

An emission standard for all emittors was defined for 367 out of 931 of the most burdensome plants. In a further 199, an emission standard was designated for some emittors, but 365 of the most burdensome plants still have not had emission standards set. According to guidelines of the Department of Environmental Protection, MAGTiOS, these plants must have emission standards in effect by 1980. The most unsatisfactory state of affairs in this area appears in the Bielsko-Biala, Gdansk, Jelenia Gora, Katowice, Legnica, Poznan, Radom, Szczecin, Walbrzych, and Wroclaw voivodeships. There are, however, voivodeships which have fully or partially defined emission standards for the majority of the most burdensome plants. These are: Kielce, Konin, Lublin, Olsztyn, Opole, Piotrkow Trybunalski, Rzeszow, Sieradz, Skierniewice and Tarnobrzeg.

629 industrial plants were obligated to conduct emission and fallout measurements of dust and gas contaminents. However, 116 plants did not measure dust emissions; 184 did not measure gas emissions; and 223 did not conduct fallout measurements.

Last year, 159 penalties for a combined total of 14.5 million zloties were assessed for offences concerning emission standards. (In 1977 there were 128 penalties for 14.2 million zloties). At the same time, 173 criminal mandates were imposed upon manual laborers who were responsible for the protected state of the environment, for a combined amount of 62,700 zloties.

In 1978, compared with recent years, the number of constructions brought into operation without a simultaneous introduction of equipment for environmental protection diminished. However, 28 such cases were registered, 23 of which concerned a lack of equipment for water pollution control, 5 for air pollution control.

9309
CSO: 5000

WATER POLLUTION, CONTROL DESCRIBED

Warsaw WIADOMOSCI STATYSTYCZNE in Polish No 11, Nov 79 pp 11-15

[Article by Marian Grzesiak, M.S., Department of Agriculture and Food Management, Main Statistical Office: "The Threat to and the Protection of Environment in Poland--Water (1)"]

[Excerpts] Water Pollution and Pollution Control

Protection of water as an element of the natural environment applies not only to the quantity of water but also to its quality. In order to be properly used, not only the quantity of water must be equalized (water used must equal water available) but also water cleanliness must be maintained.

Water pollution threatens economic development of certain regions of the country and it impacts unfavorably on the quality of life and the health of the population.

Every year our country suffers some, hard to precisely quantify and hard to register, but nevertheless serious losses due to the pollution of surface water which is the main source of water to satisfy the needs of the population and the national economy.

Surface water satisfies about one-half of consumers' demand for water, about 90 percent of industrial demand and practically all irrigation demand.

First of all, pollution of surface water causes an increase of the cost of cleaning the water for the populace and the industry. Also, that pollution causes losses of fish stock, damage to concrete and steel structures, damage to floating objects, silting of rivers with sewer sediments. Moreover, the polluted water is unfit for agricultural and garden irrigation, it eliminates river swimming, restricts water sports and spreads diseases to humans and animals who use the contaminated water.

The continuing increased demand for water is connected with the intensive socioeconomic development of the country. This increased demand, in turn, produces an ever growing quantity of wastes dumped in the water.

The combined total of wastes drained into surface waters in 1978 (rivers, lakes, ponds and directly into the sea) amounted to about 12.1 billion cubic meters and was 43 percent higher than the quantity of wastes drained in 1970 (Table 4).

The wastes drained into the surface waters directly from industrial plants amounted in 1978 to about 10 billion cubic meters (including the water used for cooling and the polluted water from the mines). The remaining balance of 2.1 billion cubic meters of sewage was drained into the surface waters by the urban sewage systems which collected sewage from households and some wastes from industrial, construction and transportation plants, offices, service establishments and other consumers of water.

Accepting that the water used for cooling can be considered clean and not requiring purification (7.5 billion cubic meters), the volume of wastes drained into the surface waters requiring purification amounted to 4.6 billion cubic meters in 1978 which included 2.5 billion cubic meters of industrial waste and 2.1 billion cubic meters of urban sewage.

Of all wastes requiring treatment, only 57 percent was treated and the rest (43 percent) was drained into rivers and other drainage areas without any treatment.

The category called "treated wastes" also requires a critical look. In the situation in which as much as 62 percent of the total 2.6 billion cubic meters treated in 1978, were treated only by mechanical means, the effects of the reduction of pollution could not have been satisfactory. For instance, the level of reduction better than 90 percent in terms of suspended matter was reached in 6.2 percent of the total drainage requiring treatment and, in terms of biochemical oxygen requirement, in only 3.4 percent.

In terms of location, in 1978, 68 percent of industrial and urban wastes requiring treatment were concentrated in 13 voivodships in which at least 100 million cubic meters were drained into surface waters during the year. Listed in order of their share of the total requiring treatment, these voivodships were: Katowice (19.4 percent), Warsaw City (10.2 percent), Krakow City (7.9 percent), Lodz City (3.8 percent), Bydgoszcz (3.7 percent), Szczecin (3.7 percent), Opole (3.2 percent), Tarnow (3.1 percent), Konin (2.9 percent), Gdansk (2.7 percent), Wroclaw (2.5 percent), Jelenia Gora (2.4 percent) and Torun (2.4 percent). The above shows that most of the wastes requiring treatment were concentrated in southern voivodships which means that most of our rivers were exposed to pollution in their upper reaches.

In the 2 billion cubic meters of treated wastes drained into the surface waters in 1978, the principal share belonged to the following voivodships: Warsaw, 430 million m^3; Krakow, 303 million m^3; Katowice, 271 million m^3; Lodz, 162 million m^3 and Szczecin 85 million m^3. Together in the above voivodships, 63 percent of completely untreated wastes were drained into the surface waters. In this case, the share of southern voivodships was also significant.

Table 4. Industrial and Urban Wastes Drained Into Surface Waters

(1) Wyszczególnienie	1970	1975	1978	1970	1978
	(2) w milionach m^3			w odsetkach (3)	
(4) Ogółem[a]	8494,8	10533,9	12116,7	100,0	100,0
(5) odprowadzone:					
(6) Bezpośrednio z zakładów przemysłowych[b]	7086,4	8573,6	9991,4	83,4	82,5
(7) w tym wody chłodnicze	4792,0	6255,9	7510,0	56,4	62,0
(8) Kanalizacją miejską	1408,4	1960,3	2125,3	16,6	17,5
(9) Ścieki wymagające oczyszczania	3702,8	4278,0	4606,7	100,0	100,0
(10) Oczyszczane[c]	2003,2	2261,5	2612,5	54,1	56,7
(11) mechanicznie	1495,3	1498,1	1630,4	40,4	35,4
(12) chemicznie	207,7	278,7	256,3	5,6	6,2
(13) biologicznie	300,2	484,7	695,8	8,1	15,1
(14) Nie oczyszczane z zakładów przemysłowych	1699,6	2016,5	1994,2	45,9	43,3
(15) odprowadzone kanalizacją miejską	954,5	1331,5	1172,2	25,8	25,5

a Łącznie z wodami chłodniczymi i nieoczyszczanymi wodami kopalnianymi. b Dane obejmują również wody chłodnicze w zbiornikowych układach chłodzenia skraplaczy turbin elektrowni cieplnych, pracujących na węglu brunatnym, których ilość w 1978 r. wynosiła 1854,1 mln m^3. c W oczyszczalniach zakładów przemysłowych i jednostek gospodarki komunalnej.

Źródło: dane GUS.

Key:

1. Item
2. In millions of cubic meters
3. In percentages
4. Total[a]
5. Drained
6. Directly from industrial plants[b]
7. Cooling water included in the above
8. From urban sewage
9. Sewage requiring treatment
10. Treated[c]
11. By mechanical means
12. By chemical means
13. By biological means
14. Not treated from industrial plants
15. Carried by urban sewage

a) Including the water used for cooling and the polluted mine water

b) The data also include the cooling water (1,854.1 million cubic meters in 1978) in the tank cooling systems and in the turbine condensers of thermal power plants fueled by brown coal

c) In the water treatment installations of industrial plants and communal enterprises.

Source: Data provided by the Main Statistical Office.

Among 3,700 industrial plants having predominant impact on the national water-drainage system in 1978 (plants draining more than 40,000 cubic meters annually), as much as 62 percent did not have any pollution treatment facilities. Those plants drained their untreated wastes either directly into the surface waters (607) or through an urban sewage system (about 1,700). Additionally, quite a large number of industrial plants (about 200) drained all their untreated wastes directly into the surface.

Wastes treated in the industrial plant treating facilities includes about 71 percent treated by mechanical methods which simply eliminated impurities not soluble in water (solid matter and fats) and only 12 percent treated by biological method which assured the percentage reduction of pollution satisfying the requirement of production of the water environment (17 percent of wastes treated by industry was done by the chemical method).

As mentioned above, 75 percent of wastes drained by industrial plants in 1978 into surface waters consisted of the so-called cooling water, that is water used in production processes for cooling purposes. This water is disposed of through a dedicated drainage system (separate from other wastes), it can be considered as not requiring treatment. It must be emphasized, however, that the cooling water, as it has been warmed up, causes various changes in the natural environment into which it is emptied. The quantity of this water grows all the time, for instance in 1978 there was 57 percent more of it than in 1970.

In 1978 about 820 million cubic meters of industrial wastes were drained into surface waters without any treatment. Included in this quantity were the wastes of industrial plants which did not have their own treatment facilities or had such facilities with the capacity smaller than the unit outfall of their wastes. In 1978 there were 607 such plants using more than 40,000 cubic meters of water each. It should be noted that 90 percent of the total quantity of 820 million cubic meters of untreated wastes were concentrated in 170 industrial plants each of which drained more than 1 million cubic meters of wastes and that 76 percent consisted of wastes from 15 plants each draining over 5 million cubic meters of untreated wastes annually.

The situation was also affected by a highly unfavorable state of organization and poor qualifications of personnel devoted to management of waste disposal. Among 3,700 plants which mattered in 1978 for the industrial waste disposal system, almost 65 percent did not have a single full-time employee for the management of waste disposal. Considering that in many plants this management was assigned to one of the engineers as an additional duty to the more important production tasks, the above shown percentage increases to 93 percent.

In 1978, among the 803 incorporated cities, 670 cities had sewage systems. About 73 percent of the total urban population used those systems. Among the remaining 133 cities which did not have sewage systems, 128 cities had less than 10,000 inhabitants and 5 cities had between 10,000 and 50,000 inhabitants.

Urban sewage systems drained about 2.1 billion cubic meters of wastes including about 780 million cubic meters originating in industrial plants. The wastes drained through urban sewage systems, amounted to about 46 percent of total wastes requiring treatment.

The majority of these wastes (55 percent) was drained untreated. This undesirable situation was caused by the fact that only 345 cities were served by sewage treatment plants. Only 187 cities were served by mechanical-biological treatment facilities which guarantee the reduction of pollution approaching the requirements of the water environment receiving the drainage. The remaining 158 cities served by sewage treatment facilities, were equipped with mechanical treatment devices which, when properly operated, guarantee on the average about 30 percent reduction of pollution.

In the 2.1 billion cubic meters of wastes drained in 1978 by the urban sewage systems, the treated wastes amounted to about 950 million cubic meters and included in that quantity just over half were treated by the mechanical method (about 500 million cubic meters).

Among 458 cities not served by sewage treatment facilities (57 percent of the total number of cities), 353 cities had under 10,000 inhabitants, 86 cities had between 10,000 and 50,000, 12 cities between 50,000 and 100,000 and 7 cities had over 100,000 inhabitants (including Warsaw and Lodz).

This undesirable situation was exacerbated by improper operation of many sewage treatment plants serving the cities. For example, 62 percent of the total number of treatment plants were operated under the conditions of overload in relation to the throughput capacity and 52 of those plants were overloaded by the factor of three. In result, the reduction of pollution was very unsatisfactory; for instance, in 1978 the pollution reduction index exceeded 90 percent, in terms of suspended particles, in only 2.9 percent and, in terms of biochemical oxygen requirement, in only 5.2 percent of the total wastes drained through urban sewage systems.

The above presented characteristics of quantity and quality of liquid wastes does not cover all sources of water pollution. Outside the quantities given remain the household sewage in cities which do not have sewage systems, the wastes from small production plants and the sewage from the agricultural sector. In the latter, special attention should be given to the sewage from large animal farms (so-called liquid manure). Unfortunately, no quantification of the burden imposed by those sources is possible now because of their vast dispersion and the lack of records of any kind.

Also, it must be borne in mind that not only drainage causes pollution of surface waters. An ever growing share of water pollution is caused by the ever wider use of pesticides, mineral fertilizers and various chemicals used by households. This situation has a definite impact on the water environment.

The determination of changes of quality of the flowing surface waters (rivers) is possible thanks to the fact that already for several years a survey of river cleanliness has been conducted in Poland using a standardized method of testing

and interpretation of results. The starting data for the development of an appropriate estimate (currently done by the Institute of Environmental Development) are the test results of periodically gathered comparable water samples. The control analyses are performed by voivodship centers for research and control of environment (independent laboratories).

Table 5 summarizes the results of classification of water cleanliness in the rivers being monitored during the years 1967-1977. The analysis of these data shows that in the last 10 years the efforts to stop the progressive pollution of our rivers have not been successful. Particularly visible is the shortening of stretches of rivers carrying water of first class quality, i.e., water of the highest clealiness level, which is suitable for communal purposes (drinking water), breeding fish of the salmon family and for the food industry. The increasing share of water polluted in excess of acceptable standards is alarming which in practice means the transformation of these river sections into sewers.

Also disquieting is the state of underground waters which are an important source of supply for urban and rural population. The results of inspection conducted by the State Sanitary Inspectorate in 1978 indicate an especially unfavorable sanitary condition of wells both in the cities and the country. Most objectionable was the sanitary condition of wells serving individual homes; 47 percent of inspected wells received bad sanitation marks and, in the country, that percentage went up to 72 percent. Also, the public wells received bad sanitation marks: 38 percent in the cities and 45 percent in the country. Analoguous marks were received by wells in places of employment: 33 percent in the cities and 41 percent in the country.

The neglect and irregularities in the management of water wastes manifest themselves progressively more often in catastrophic pollution of the surface and underground water which requires intervention of environment protection services. In 1978 there were 374 cases of this kind, including 67 cases of pollution with oil products and 40 with liquid manure. Control or neutralization of the latter is becoming one of the most burning problems among the efforts oriented to the protection of environment.

The most frequent reasons for catastrophic pollution were: lack of elementary concern for the condition of waste management equipment, noncompliance with the production discipline and putting facilities into operation without simultaneous start up of equipment for the protection of water environment (e.g., there were 23 such cases in 1978).

The analysis of statistical results of monitoring of the sources of potential and actual water pollution, done by the environmental services in the field over the period of a few years, permits to state that the above described negative phenomena are becoming more serious with time. For instance, the number of plants punished for polluting waters increased from 677 in 1975 to 1,536 in 1978. The penalties imposed changed correspondingly from 103 million zlotys to 350 million zlotys. In addition to pecuniary penalties imposed on plants, the legal rules provide for penal sanctions against physical persons guilty of harmful pollution of waters or failure to use the pollution treating

Table 5. Cleanliness Conditions of Rivers Monitored Through Measurements

(1) Wyszczególnienie	1967	1970	1973	1977[a]
(2) **Okres kampanijny**				
(3) **W kilometrach**				
(4) Długość badanych odcinków . . .	11493	12506	12704	13504
(5) Klasy czystości wód: I	3633	3101	2979	1779
II	2941	3655	4093	3971
III	1607	2206	2284	3620
(6) Wody nie odpowiadające normatywom	3312	3544	3348	4134
(7) **W odsetkach**				
(4) Długość badanych odcinków . . .	*100,0*	*100,0*	*100,0*	*100,0*
(5) Klasy czystości wód: I	*31,6*	*24,8*	*23,4*	*13,2*
II	*25,6*	*29,2*	*32,2*	*29,4*
III	*14,0*	*17,6*	*18,0*	*26,8*
(6) Wody nie odpowiadające normatywom	*28,8*	*28,4*	*26,4*	*30,6*
(7) **Okres pozakampanijny**				
(3) **W kilometrach**				
(4) Długość badanych odcinków . . .	11493	12506	12704	13504
(5) Klasy czystości wód: I	3794	3111	2996	1805
II	3303	4026	4293	4108
III	1779	2440	2316	3663
(6) Wody nie odpowiadające normatywom	2617	2929	3099	3928
(7) **W odsetkach**				
(4) Długość badanych odcinków . . .	*100,0*	*100,0*	*100,0*	*100,0*
(5) Klasy czystości wód: I	*33,0*	*24,9*	*23,6*	*13,4*
II	*28,7*	*32,2*	*33,8*	*30,4*
III	*15,5*	*19,5*	*18,2*	*27,1*
(6) Wody nie odpowiadające normatywom	*22,8*	*23,4*	*24,4*	*29,1*

a Dane nieostateczne — dla części rzek ocenę oparto na wynikach kontroli czystości z lat poprzednich.

Źródło: dane Instytutu Kształtowania Środowiska.

Key:

1. Item
2. Production season
3. In kilometers
4. Length of monitored sectors
5. Water cleanliness class
6. Waters outside the standards
7. Off season

a. The data are not final: for some of the rivers, the estimate is based on the previous years cleanliness monitoring.

Source: The Institute for Environmental Development data.

equipment. Those rules, however, are still used to a very limited extent. For instance, in 1978, the field services for the production of environment submitted to the prosecuting attorneys 78 documented cases, 4 of which resulted in convictions. Administrative disciplinary action was requested in 153 cases submitted to the delinquency boards and 100 cases resulted decisions imposing penalties for the total sum of 88,200 zlotys.

8801
CSO: 5000

CURRENT WATER POLLUTION SITUATION DESCRIBED

Warsaw AURA in Polish No 10, Oct 79 p 1

[Article: "The Continuing Problems of Sewage"]

[Text] In April 1978 we presented here "The Picture of Sewage Treatment." We are taking the subject once again. After some delay (the work lasted a long time), we obtained an evaluation of the results of surveys and tests conducted in 1978 by territorial units for matters of environmental protection concerning water and air pollution control. Today, in dealing with an evaluation of survey results, we shall confine ourselves to water.

In 1978, the amount of industrial and communal sewage that required treatment, and had drained into surface water, totalled 4.6 million m^3 (54 percent directly, 46 percent by municipal sewage systems). In comparison with 1977, the amount of sewage requiring treatment increased by 300 million m^3. Only 56 percent of the sewage was subject to treatment; the remaining 44 percent was drained into surface waters without any treatment at all (41 percent in 1977). Of 2.6 million m^3 of treated sewage in 1978, as much as 62 percent represented sewage that was treated entirely by machine, which is a very unsatisfying fact. Sewage treated by biological means, which guarantees a degree of reduction approaching the requirements of sewage receptors, amounted to 700 million m^3 in 1978, that is, scarcely 15 percent of the total amount requiring treatment. The communal economy produced 46 percent of total sewage, of which 55 percent drained into surface waters without any treatment. This arises from the fact that, of more than 800 cities, only 43 percent are serviced by sewage treatment plants.

In 1978, sewage treatment plants were put to use in 82 industrial enterprises and 10 cities (with a combined flow capacity of 379,300 m^3 every 24 hours, or 35 percent of the planned quantity). Among the more important facilities for water pollution control that were put to use in 1978 are sewage treatment plants at the "Jaworzno" Pit Coal Mine, at Nitrogen Plants in Tarnow, at Phosphoric Fertilizer Plants in Lubon, and at the Tatra Highlands Plants of the Fruit and Vegetable Industry in Nowy Sacz. Of the cities, Przemysl, Pulawy and Myslenice obtained sewage treatment plants.

All of these sewage treatment plants influence the state of purity of the Vistula river basin, which is particularly important because of a resolution undertaken in 1978 by the KC PZPR which deals with a comprehensive program for the development and utilization of the Vistula and the water resources of the country.

Last year, 12,257 plants representing sources of surface water pollution were found as evidence of the services of environmental pollution control. 7,286 plants had a regulated status in the area of sewage drainage. Of that, 5,624 were from Water Law licenses and 1,662 were from exemptions with Article 135 of the Water Law.

In 8,419 analytical tests, an excess in the admissable loads of contamination in the drained sewage was found in 3,528 cases. Sewage drained from enterprises of the agricultural industry, pig farms, sugar factories, dairies, meat plants, egg and poultry plants, and fruit and vegetable enterprises, exerts the most harmful influence in water purity.

In 1978, test measurements were taken on the purity of surface waters flowing into 2,268 sections located in 547 rivers with a combined length of 21,488 km. The surveys also included 100 lakes as well as the Szczecinski Gulf and Pomeranian Gulf. For the needs of a comprehensive development and utilization of the Vistula and the water resources of the country, an evaluation was made of the water quality of the Vistula and its 56 tributaries. Water quality during the period of 1973-77 ran as follows: Class 1 - 919.3 km or 12.7 percent; Class 2 - 2,041.5 km or 28.2 percent; Class 3 - 1,843.5 km or 25.5 percent; water not meeting the norms equal 2,427.4 km or 33.6 percent. In comparison with survey results from 1968-73, there followed a deterioration in water quality from the Vistula basin, which expressed itself through an increase in the quantity of Class 3 water, as well as those waters excessively polluted, at the cost of a decrease in higher quality water, that is from Classes 1 and 2.

In 1978, 374 accidental contaminations of surface or subsurface waters occurred which demanded the intervention of environmental protection services. Among other things, permanent contamination of the Wisloka, worse than normative, was found. (Intake for Mielec in 1978 was nine times the amount used). The most frequent reason is a lack of elementary care for the proper state of sewer administration equipment and a failure to maintain production requirements. As an example: during 1978, the Turov Electric Power Plant alone had 25 cases of accidental spilling of suspended matter into the Miedzanka River (pump breakdowns, pipeline leakage and so on).

In 1978, 1,536 plants were penalized in the amount of 350 million zloties. (In 1977, it was 1,340 enterprises for a total of 300 million zloties. Local services sent 78 documented motions to the public prosecutor's office concerning manual laborers guilty of harmful contamination of the water, but only four condemnatory sentences were passed.

9309
CSO: 5000

STEPS TAKEN TO DEAL WITH ADRIATIC'S POLLUTION PROBLEM

Zagreb VJESNIK in Serbo-Croatian 8 Dec 79 p 27

[Article by Vesna Kusin]

[Text] Even though the Adriatic sea is largely clean, parts of it along the coast have been greatly polluted by the many outlets carrying sewage and industrial waste water. Consequently, many areas of the Adriatic are threatened, particularly those near the large population centers. The only solution is the construction of sewer networks, collectors, installations for purifying the waste water and long discharge channels leading into the sea.

It may be said that the first steps toward a cleaner sea have been made in some places. Some long discharge channels have been built, some are now under construction, a number are in the planning stages, and for some areas the ecological studies which must precede construction undertakings are either underway or completed. Even though not everybody took the same route (first, the urban plan must be made, then the ecological studies and, finally, the planning stage), it is good to gradually approach such important activities in any manner at lal. We tried to learn from interviews with the experts how the individual cities have solved the problem of cleaning up their waste water.

The Slovenians are among the first who noticed that they cannot indefinitely treat their 41 kilometer-long coast in such a destructive manner, destroying this easily exhausted area. Therefore, they have not only made a provision for, but have also begun the construction of long discharge channels to the sea after the previous mechanical purification of the waste water.

"The first such system was built near Portoroz," says Andrej Avcin, the scientific assistant of the Marine Biological Station in Portoroz (The Marine Biology Institute in Ljubljana). "This system collects the waste water from Piran, Lucija and Portoroz, takes it to the separator where it is mechanically purified, and then it is sent through a 3,640-meter-long channel into the sea at a depth of 22 meters."

"Before this channel was built," continued Engr Vito Mavric from the Community Enterprise in Portoroz, "all the bathing areas here were on the borderline as far as sanitary conditions are concerned. This channel has been working without interruptions since 1975, and the controls which are constantly being performed indicate that the sanitary condition of the sea has improved by 90 to 95 percent. However, it should be pointed out that the International Bank made the construction of this system a condition when the construction of the Bernadin hotel complex near Portoroz was started. At that time, the ecologic study, without which the banks in Slovenia would not have approved the credit for this investment, was done first. In Slovenia, an agreement was reached according to which the Slovenian banks would not give credits for any major project without a previous ecological study."

What Did the Ecological Studies Show?

"After the waste water has been purified, we are left each year with approximately 550,000 cubic meters of mud which we deposit in a sanitary fill and we are in the process of examining the possibilities for its further exploitation," concluded Mavric.

"Still, this channel is not the only one in the Slovenian littoral," emphasized Maruska Lenarcic, the scientific assistant at the Marine Biology Station. "A collector has been built, and the long channel into the sea is being installed, while in Koper the construction of a similar project has begun a few days ago."

If everything goes according to plan, it may be expected that in the foreseeable future such systems will be built all along the western coast of Istria. The marine research center of the Rovinj-Zagreb Institute Rudjer Boskovic has performed ecological studies for Pula, Porec and Umag, while that for Rovinj is still being worked on. These studies form the foundation for the plans for such systems, which are also being produced. Thus, the construction of long channels is planned for Umag, Novigrad, to the north of Porec, near Carvar and south near Vrsar. In Rovinj, where the conditions are alarming, two channels are planned, and in Pula, three (a central one, one each north and south of the city). Naturally, not all these projects will be realized simultaneously, but rather according to a set of priorities, based on how threatened the individual regions are.

"During the testing of the sanitary suitability of the sea," stated Dragica Fuks, scientific assistant at the Center for Marine Research in Rovinj, "it became evident that Rovinj and Pula are very threatened, the situation near Porec is better, while all the tests have shown that the area around Umag is clean."

Even though a considerable amount of time will probably elapse before the final realization of all these projects, it is interesting to know what the ecological studies have shown thus far.

"Along the western coast of Istria, the self-purifying power of the sea is such that it is only necessary to construct sufficiently long discharge channels and perform mechanical purification," explained Dr Ljubomir Jeftic, chief coordinator for all these studies in the Institute. "Ten years ago, the view was that the only good system is one which uses biological purification. However, it has been shown that such purification removes certain substances, but not the nutritious salts such as the nitrates, nitrites, phosphates, ammonia and others. Consequently, the plankton in the sea grows and flourishes even faster because it is provided with purified nourishment, which leads to a tremendous flourishing in the sea and consequent pollution. This is why, for example, in Italy they had to install chemical purification after the biological purification, which is very expensive. Because the movement of the water mass and aeration of the sea are such that it can degrade the waste if provided with channels which discharge the waste sufficiently far from the coast (approximately 2 kilometers) we do not think it is necessary to install the expensive biological purifiers, because it is sufficient to have the waste water mechanically purified. This means that, with the present load, this ecological system can process the waste matter without returning any to the shore. Once these systems are built, in Pula, for instance, the port, which is very polluted now, could be truly revitalized in a few years."

Alarming Data

Rijeka is probably the most threatened area in the Northern Adriatic. Even though approximately 200,000 people live in the area, they pollute the Rijeka Gulf as if they numbered 1.2 million, according to the calculations made by Mr Bogdan Sekulic in the Institute. This is a direct result of discharging all the industrial and municipal waste water directly into the sea. Even though the ecological study of the Rijeka waters is not finished, the inhabitants of Rijeka are preparing to resolve this complex problem. (In a few days, the ships are scheduled to sail again, which will mean a continuation of a 3-year-long study which was interrupted because the investors had not met their obligations. Now, the contracts for additional testing have been signed by DINA, the thermal powerplant and the INA refinery, but they are still waiting for the oil pipeline, Voplin, the coke plant and the port for nonpackaged cargo).

Along with the testing of the waters," said Bozidar Horvat, the manager of OOUR Sewer work of the Work Organization Voplin in Rijeka, "we, along with the SIZ of community affairs are financing the testing of the municipal waste water. When this is finished, we will know how to plan the future installation for purifying the water. So far, we know that the 17 channels between Preluka and Martinscica must be replaced by long channels leading into the sea. To that end, we intend to collect most of the municipal waste water at the mouth of Rjecina and to take the far from the coast with an underwater channel. In addition to this, we will have another channel at Kantrida and in the Bakar Gulf. We have already built the Susak collector which takes the Susak waste water to the delta, and a collector along the left bank of the Rjecina. We are now building one on the right bank."

Will it be sufficient to build only the installations for mechanical purification in Rijeka, or will it also be necessary to build biological and later even chemical purification installations? This will be known only after the ecological study is complete. This study encompasses the Bakar and Omisalj gulfs, in addition to the Rijeka Gulf.

In Zadar, along the stretch between Puntamika and Gazenica, which measures 6 kilometers, there are now 59 sewer channels, which is really unacceptable. This is why the citizens of Zadar have commissioned a study of the sewers and the possibility of the removal of waste water. The results of the study have shown that the water currents in the gulf of Zadar are very unfavorable (the water in it changes, at the most, twice a year), so that they will build in the first phase the installation for mechanical purification, and later those for chemical and even biological purification.

"In any event," said Engr Marijan Zivko, "Zadar will have three long channels leading into the sea: The first in Puntamika, measuring 1,700 meters, then one on the border between the central and industrial zones near Arbanasi measuring 2,000 meters and one between Bibinje and the industrial zone, measuring 700 meters."

A Useless Project?

Split is the only town along the Croatian coast which already has a channel measuring 1.5 kilometer in length which lets out the waste water from a portion of the city at a depth of 45 meters. For now, the water is only mechanically purified, but when all the waste water from Split is channeled here, it is possible that a biological purifier will be installed as well, according to the opinion of Dr Ante Baric, the president of the Committee for the Protection and Improvement of Human Environment of the Executive Council of the Split opstina. With that in view, samples are being taken from the outlet of the channel and they are being analyzed so that the possibilities for the degradation of waste in this part of the Brac channel may be determined.

After Split, Dubrovnik is probably the next city which will get such a system with a long channel leading into the sea. Thus, the present 33 small channels, which have polluted the sea near certain parts of the town, will be eliminated.

"This project was also dictated by the International Bank when the construction of Babina Luka was started," said Adam Benovic, the director of the Biological Institute in Dubrovnik. "Too much time has elapsed since then, but still, the work is nearing completion. The Dubrovnik system will only have mechanical purification and a 500-meter-long channel. The waste water will come out at a depth of 90 meters. This is possible here, because Dubrovnik is in the path of east Mediterranean waters which enter the Adriatic at this point creating strong currents, and also because of the proximity of the southern Adriatic valley, where the water is very deep and which consequently has a hugh water mass. Consequently, any kind of waste can be quickly degraded here."

We have started moving, which is essential. It is difficult to foresee how long the process of cleaning up the coastline will take. The first successes, achieved in Portoroz and Piran may stimulate others to attempt such undertakings. While they are certainly not cheap, they bring about great benefit. The first step in this direction are the ecological studies which indicate how much waste a certain portion of the sea can accept, and which serve as guidelines in choosing the purification system. Fortunately, our sea's exceptional capacity for self-purification makes it possible in many places to secure a cleaner coast with only mechanical purification. However, all this work and effort could be for naught if the industries are not forced to purify their waste water before discharging it into the sewer systems. The question is, who will do this and how? Almost none of them cares about what the law says.

9110
CSO: 5000

DROUGHT CONTINUES TO CAUSE DAMAGE IN SEVEN PROVINCES

Effects Cause Widespread Concern

Quito EL COMERCIO In Spanish 31 Dec 79 p 1

[Excerpts] The prolonged drought which is affecting a great part of the country has begun to seriously concern broad segments of the population. According to dispatches from our correspondents, in those provinces which are the most affected, concern has changed into anguish and despair because of the destructive effects of the phenomenon.

In El Oro, Manabi, Loja, Azuay, Chimborazo, Tungurahua and part of Pichincha, the drought has fundamentally affected the life of the population, because not only are the crops dying for lack of water, but also the animals. There is no water--say the reports--not even to fill the troughs of the livestock. The farmers and ranchers, especially in El Oro, Manabi, Loja, Chimbaraz and Tungurahua, are finding themselves obliged to sell their herds at ridiculous prices faced with the danger of losing them.

Manabi Demands a Solution

In Manabi where, as we are informed, the rivers have dried up and the sluicegates which were constructed on the irrigation channels have no water to hold back, since October, the drought has caused as many conflicts as desperate public demonstrations. People cover the streets of Portoviejo and other towns in the province, demanding solutions to the problems resulting from this phenomenon.

"Our rivers which rise in the territory of this province," says a dispatch from Portoviejo," are few and have little volume, and they appear only after a rainfall; when there are winters with little rainfall, all of them, absolutely all of them dry up."

In many cities of the province the lack of water, including for domestic use, is making itself felt in an alarming way. In the North, the consumption of this liquid is rationed and in the South, the central government found itself obliged to supply tank trucks to help in the agonizing situation the Manabi population is confronting.

"Only the central zone of the province," says the dispatch, "thanks to the dam of Poza Honda, has enabled the demand for drinking water to be satisfied. For this reason, we the inhabitants of Manabi are pledged to solve our problems by means of projects which would allow saving the water from winter with the construction of large dams and the overflow of the rivers with the Daule-Peripa" [sic].

Losses in Tungurahua

The drought caused great losses in the province of Tungurahua, an area which lives almost exclusively from agriculture. "The crops have been completely ruined," says the dispatch from Ambato.

"There does not exist a single drop of water which could be used for animal troughs. The farmers and peasants are finding themselves obliged to sell their herds with serious losses. Milk production has decreased considerably and in the markets of Ambato they are beginning to feel the shortage of food products."

The inhabitants of Tungurahua are demanding the completion of the Latacunga-Salcedo-Ambato canal, which will satisfy the needs of Cotopaxi and Tungurahua. It was for this purpose, it was recalled, that last year a loan from the IDB for more than $11 million was made.

They are also requesting the search for water in the snow-covered mountains of Chimborazo and Cariahuairazo and the construction of dams on the streams and rivers to collect water from rainfall.

Frost in Chimborazo

In Chimborazo, where the drought has been termed destructive, they say that even the snow-covered mountains which surround Riobamba are "bare" because they lack snow.

The intense drought, "the frosts" and other phenomeno which have occurred in this region reveal a dangerous situation.

The farmers speak of very high costs just to be able to maintain, moderately, the crops, our correspondent in Riobamba informs us.

The vegetables which normally can withstand the "frosts," this time could not withstand the severity of this disaster, which occurred on Christmas Eve. In general, the outlook is distressing. The fields with their drooping plants and tired farmers are the factors which suggest difficult days ahead for this region.

The regional offices of agricultural and technical assistance can do nothing to compensate for the bad weather which does not allow a coordinated and sustained action.

The farmers think that these last circumstances caused strong increases in costs and operating expenses, which will be reflected in the prices of the products on the market.

Production will fall and the refinancing of loans will be inevitable.

The Cutting

The uncontrolled cutting of the "chaparro" and the jungle, favored by the IERAC (Ecuadorian Institute for Agrarian Reform and Settlement], and squatters are causing much damage to the climate and the soil.

However much one might like to replace the vegetation with foreign species, like eucalyptus, the natural mountains can never be replaced as the protectors of the soil and the producers of water. On more than one occasion, it has been observed that the artificial replacement of the great "chaparral" by eucalyptus, or pines, did not compensate for the loss of springs and consequently the decreased flow of the rivers of the area made itself felt.

To this effect, it is necessary to manage the forests and to designate them as protectors and producers. We must study, first of all, the biomass and relicts of the locality so as to recover the natural forest and, through it, the sources, springs and streams which supply the rivers.

Secondly, there is no problem--they said--because there exist species which, within 10 years or more, become very profitable. The INERHI [Ecuadorian Institute for Water Resources] has signed with the Forest Development Bureau an agreement for the maintenance and conservation of the hydrographic basins and the studies of the local species, so as to recover its ecology and, with it, the soils and water.

El Oro Losses Mount

Quito EL COMERCIO in Spanish 30 Dec 79 p 1

> [Text] More than 200,000 hectares of crops are being affected by the drought which is currently devastating the province of El Oro and which will cause losses of tens of millions of sucres. The phenomenon, one of the most serious in this southern Ecuadorian region over the last 20 years, is creating despair among the peasants and farmers.

Official reports estimate that 18,000 hectares of coffee, 21,000 hectares of cocoa, 15,000 hectares of short cycle crops, 40,000 hectares of bananas, tens of thousands more of hectares of other products are suffering from the drought. The upland regions of the province, which do not have any system of irrigation and base their economy on the winter rains, are suffering the severe consequences of the season and one cannot predict what will happen during the next few months.

Human Risks

In the border zone, which is traditionally desert-like and generally neglected by the state, the destruction is alarming. The scarcity of water affects even human survival itself: the wells of the subsoil have no water, the crops are now destroyed. What were fertile fields of the El Oro countryside are now dusty paths and remains of dried up plants, without any sign of life.

Livestock production, which was high and substantially increased over the last few years, is among those affected by nature. It is calculated that at least 50,000 hectares of pasture have become worthless and that the animals, because it is impossible to move them somewhere else, will inevitably die.

To form an idea of the drought, one can observe the Jubones River, which was always full and threatening. Today it is changed into a thin thread of water, of no use at all. Banana production, which uses the systems of irrigation generated by the Jubones and which is controlled by the El Oro Provincial Council, sees the possibility of a good crop next winter dwindling away.

Clamor

In the Zaruma and Pinas area, the farmers are beginning to call for urgent measures, since the region depends exclusively on agriculture and livestock. In the area of La Victoria, in the district of Arenillas, a desperate peasant declared: "we do not know what to do. We are close to despair." In the area which includes Palmares, Las Lajas, Libertad, Puyango, Ghiriboga, Platanillo, Valle Hermoso, the corn and coffee crops are faced with complete failure. Ironically, the country silence is interrupted by the turbulent progress of the Puyango which continues without being taken into account in the development plans.

The official organizations took some measures: cloud seeding, the drilling of shallow and deep wells, but their minimal results were considered positive although not sufficient.

Alarm

The entire province: Machala, Santa Rosa, Arenillas, Pasaje, Pinas, Guabo, is being affected by the drought. On the road that leads to Guayaquil, the disappearance of the large rivers is very visible.

The population of the province is extremely alarmed. The provincial organizations are already trying to carry out some measures, but they have sought the support of the central government and the ministries in their eagerness to solve the problem.

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CSO: 5000

BRIEFS

FACTORY CHEMICAL DISCHARGE--Police in Kakamega have reported that thousands of fish and other marine creatures are dying in Sosiani River which passes through Turbo area into the Nzoia River. Police said in the report that it was highly suspected that an unknown factory in Eldoret had negligently discharged poisonous chemicals into the river or was continuing to do so. Water Development Permanent Secretary J. H. Wairagu said he and officials from his Ministry toured Eldoret last week, but this was not brought to their attention. He said he would alert his officers in the pollution control section to immediately investigate the matter. [Text] [Nairobi DAILY NATION in English 23 Jan 80 p 3]

CSO: 5000

PROTECTING THE RESOURCES OF SIBERIA

Moscow SOVETSKAYA KUL'TURA in Russian 9 Nov 79 p 6

[Article by A. Batalin, Irkutsk]

[Text] I first encountered B. Ishmuratov during unpaid mass work in the forest park zone of Irkutsk academic city.

"Yes, it is useful to be drawn away from my desk with all its papers, setting aside the pen and taking a hammer into my hand in order to make my small contribution to protection of the environment," he said into my reporter's tape recorder, and unexpectedly said, seriously, "and this is just as important as what we are doing in the institute."

Our next encounter occurred within the walls of the Institute of Geography of Siberia and the Far East of the Siberian Department of the USSR Academy of Sciences. An All-Union Conference on Applied Geography was being held there. On the badges issued on that occasion was a set of scales. On one dish was an industrial complex. On the other was a tree turning green. The inscription on those balanced dishes--"KATEK"--was a laconic and capacious symbol of why scientists had travelled there from Moscow, Leningrad, Krasnoyarsk and Tomsk... "Research, preservation and reproduction of natural resources of the Kansko-Achinskiy Fuel and Power Complex (Kansko-Achinskiy toplivo-energeticheskiy kompleks--KATEK)"--that is how the theme of the conference was formulated. At that place I also became more closely acquainted with the field of activity of the Section of Regional Problems of Rational Use of Nature and Environmental Protection, which B. Ishmuratov heads, and with the work and concerns of his colleagues.

KATEK means future superpowerful coal sections, large thermal electric power stations, new plants, cities and settlements. It means scientific developments of measures to protect the environment.

How is it to be achieved that an abundance of industrial giants does not turn the dish of the ecological scales, that the land and water, air and climate remain in purity and harmony? Naturally, one conference does not solve all the questions. But the ecological forecasts are regulated and

refined, investigations are being coordinated and recommendations are being issued to the planners.

That conference was held at the end of May, and the Institute of Geography again received guests in July. Leading ecological specialists from Argentina, Brazil, the GDR, Zambia, India, Colombia, Mexico, Nigeria, the FRG, the CSSR, the USA and Japan gathered for the Third Scientific Symposium of the Commission for Environmental Problems of the International Geographic Union. One of the guests, Professor S. Keyasta, dean of the geographic faculty of Benares University (India), said, "I have been in your country previously, but great Siberia, the achievements and high level of the work of Siberian ecologists have been for me a real geographic discovery."

Geographic discoveries. Not so long ago they were the main and romantic content of investigations of geographers. Even after the revolution, in the 1920's, geographic discoveries were made on the enormous territory of Siberia (for example, the enormous Cherskiy mountain range was discovered in Yakutiya). Now the epoch of geographic discoveries is past. And, it seems, the investigations of geographers must become less attractive... However, the very large national economic and scientific programs in the implementation of which they participate, are capable of overcoming even the soundest armament.

"To conduct scientific investigations and accomplish on that basis planned developments connected with the problem of transferring part of the runoff of northern and Siberian rivers into Central Asia, Kazakhstan and the basin of the river Volga." Behind this line from the decisions of the 25th CPSU Congress is a scientific and technical program unprecedented in Soviet and foreign practice. It is a matter of transferring enormous masses of water for a distance of thousands of kilometers from the northern to the southern borders of our country. Up to now history has not known such scales of intervention in nature.

The waters of the Ob' and Irtysh flowing into the Arctic Ocean will form another new river (or "anti-river", as the scientists say) which will flow in a new channel to the south, to Kazakhstan and Central Asia.

"In a word, is it 'turn back the rivers'?" I asked the head of the Section of Hydrology and Climatology, G. Bachurin. "No, we are decisively against such expressions, popular not too long ago," replied Genadiy Vasil'yevich. "Nature has predetermined where rivers are to flow and man has no right to force them to move backwards. One can only borrow water and redistribute it through the system of hydroelectric stations, dams and reservoirs."

"But now you see, the Irtysh and the Ob' have been partitioned by several dams. The water has overflowed and flooded a portion of the flowed fields, meadows, pastures and forests, and also some settlements in river valleys. The floodlands are fertile and generous: high yields of grain are obtained

there and the cattle are free to feed on very rich water-meadows. Therefore the flooding of flood-plains as a result of the creation of reservoirs can do serious harm to the national economic interests of Western Siberia. And so the specialists of economic geography are worried. The ichthyologists also are worried, for the creation of reservoirs hinders exchange of water masses. And the whitefish, sterlet, nelma and muksun--local fishes of valuable species--are accustomed to rapid streams, accustomed to feed and multiply in rich tidal waters.

Transport men also are worried: navigation, the conditions of which are not especially good now, will become more complex.

And what sort of river will the new river (anti-river) be? Even if a very deep channel is created in the earth for it, it will not flow along the straight channel indicated for it. Of course, probably it will flow along a straight channel, but with time, under the effect of the earth's rotation, its channel will start to meander. The banks will be eroded and collapse, and in accordance with the law of the same natural forces the right bank will become steep and precipitous, and the left, gently sloping and low. More briefly, the creation of such an "anti-river" (and even the first line of the main channel represents a channel-formed river equal to the Don) causes profound ecological shifts. They occur both in regions of the removal of river runoff and at the places of their redistribution. The ecologists are worried...

I have sketched only a very general picture of this anxiety. If we compare, it can be said, the essence of the occupation, the anxiety of the ecologists is related to three main tasks:
-- giving a scientific forecast of change of the natural climatic and ecological conditions in the region of water transfer;
-- giving a socio-economic evaluation of the aftereffects of transfer;
-- developing a scientifically substantiated complex of measures to prevent possible negative consequences. Tens of scientific research collectives of the country have been drawn in to solve the triune task. Associates of the Institute of Geography of Siberia and the Far East are conducting their searches in Nizhneye Priirtysh'ye and Priob'ye, where very considerable changes in the natural environment are expected.

If one turns over the pages of imposive volumes of scientific reports, even to a dilettante in that area of knowledge it becomes clear how much has already been done. Agricultural lands along the banks have been studied and an economic evaluation of them has been given. Landscape maps have been compiled on which types and subtypes of lands have been distinguished; for each of them a characterization has been given of the formation of the relief, the absolute and relative heights, and the composition and yield of plant groups... On the basis of study of the climate, the microclimate and hydrology, forecasts are given of the possible changes of the hydrometeorological regime and climatic conditions under the influence of the removal of the waters.

The scientists have already succeeded in convincing the planners to lower the maximum markers of the water levels at places of removal to the level of the floodplains (that is, the spring floods of rivers). Of course, the floodplains will not be flooded!

"But why don't we transfer the water by pipes, instead of creating an earth channel, fraught with large losses of water and many other negative consequences?" asks R. Bachurin. "The idea of pipelines was advanced by Professor S. Bendrov, of the Institute of Geography of the USSR Academy of Sciences, which is related to us. The expenditures on gigantic pipelines will be large, but advantages and economic and ecological benefits still have to be calculated, and not just from positions of today and tomorrow, but also of the day after tomorrow."

Today you can hardly keep Vachurin, Ishmuratov and many of their colleagues in the institute. On the doors of many rooms of the institute can be found notes reading, "All are away on expeditions." In the field season there is an atmosphere of military actions and the field manual. It is not for nothing that the research groups are called detachments, and they live a restless camp life. Detachments of the institute are working on the route of the Baykal-Amur Main Line, in Yakutiya, Krasnoyarskiy Kray, Cabaykal'ye and Pribaykal'ye, in a word, they have scattered all over Siberia.

"Sibir'" ("Siberia") is the name given the complex superprogram developed by the Siberian Department of the USSR Academy of Sciences. Questions of ecology in the program are handled by the Institute of Geography of Siberia and the Far East.

"You journalists like to write that Siberia has boundless possibilities and inexhaustible resources. However, this has become a commonplace in many scientific investigations," says Vladimir Vasil'yevich Borob'yev, doctor of geographic sciences and director of the institute. "Actually, in Siberia there are large natural resources. Here is a large portion of the land resources of the country, three fourths of the forests, two thirds of the coal reserves, a large portion of the predicted reserves of oil and gas... If the small numbers of the population are taken into consideration, then actually an impression of inexhaustiblity of resources is created. Such a frame of mind is widespread and is reflected in design and planning decisions.

However, the natural resources of Siberia are better estimated, not from the local but from the statewide point of view, for they are an all-union fund! Such an angle of vision gives us no grounds for complacency. It cannot be thought that our resources are unlimited.

Of course it is not a question of the preservation of untouched nature, which is impossible and unnecessary (with the exception of reserves), but of methods of rationally using its resources that do not lead to destruction of a natural complex. The rational use of nature and preservation of

the environment is not just a purely scientific task. It is a national task, and practically everyone participates in its solution. For in the final account we all are striving to have improvement of the living conditions of the people occur as a result of development of the economy and the opening up of new territories.

And here I recalled that unpaid mass work in the academic city, about which I reported once. Then it was thought: does it make sense to go out with shovels into the public gardens and parks, if thanks to the chemical combine smoke-stacks the needles on the pine trees yellow and dry up?

Now these facts seem unambiguous to me. For a square meter of forest lawn littered by an individual small group in terms of all the population seeking recreation (and the littering among them) turns into square kilometers. And we, of this same population, 1000 times more than the plants and combines.

Problems of the interaction of man and nature can be formulated and solved in various aspects. By the level and methods of their formulation and solution in our time it is possible to judge the culture of society, of the state.

In our state questions of attitudes toward nature are transformed into a moral, spiritual category before which the amateur fisherman and the plant director, builder and scientist are equals.

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CSO: 5000

NEUTRALIZING VEHICULAR EXHAUST GASES

Kishinev SEL'SKOYE KHOZYAYSTVO MOLDAVII in Russian No 11, Nov 79 pp 54-55

[Article by P. Lipskiy, chief of the Production-Technical Administration, Moravian SSR Ministry of Motor Transport, and S. Pogorelov, assistant professor, Kishinev Agricultural Institute]

[Text] In our country serious attention is given to the question of the low-toxicity operation of internal combustion engines. As a component part of the problem of the preservation of nature and rational use of natural resources it has acquired more and more importance in recent years in connection with an increase of the number of motor vehicles and of the power of their engines. The plants of the Soviet Union, constantly improving the design of internal combustion engines, have achieved considerable successes in the development of a low-toxicity process of fuel combustion in a cylinder.

At the same time modern methods of research have permitted establishing the presence of many harmful components in exhaust gases of engines using fuel of petroleum origin. In that connection the question of the low-toxicity operation of internal combustion engines is a multi-level one. A number of scientific-research laboratories and institutes of the country are solving problems of the neutralization of exhaust gases of engines installed in motor vehicles, tractors and other means of transport.

Collaboration of scientific institutions and production on this level gives results. Already now a number of requirements for toxicity have been worked out that engines in operation must satisfy. Many of them have been formulated as All-Union State Standards (GOST's) and are compulsory on the entire territory of the USSR. Systems for neutralization of the exhaust gases of certain engines have been developed, and also neutralizers for light motor vehicles. All these developments have permitted reducing the toxicity of exhuast gases of engines with respect to individual components.

However, neither neutralizers nor other means of neutralization used at the present time are capable of solving the question of low-toxicity operation of engines completely. Such methods do not exist yet. Therefore a complex of measures to neutralize exhaust gases is necessary.

It is well known that the toxicity of engines depends in particular on the operating conditions, the degree of natural ventilation of the inhabited point, the enterprise, etc, and many other factors. The concentration and specialization of production, intra-economic and inter-sector cooperation that is developing intensively in the Moldavian SSR are unthinkable with out a developed motor-vehicle and transport-machine pool. Therefore a continuous growth of the motor-vehicle pool of the republic and its industrial enterprises is a natural thing.

The daily flow of motor vehicles, with transit taken into consideration, in the main cities of the republic (Kishinev, Bel'tsy, Orgeev, Tiraspol', Bendery, Ydintsy and Dubossary) amounts to from 8,000 to 15,000.

This means that a great deal of carbon monoxide, hydrocarbons, nitrous oxide, particles of lead, soot and other harmful substances is ejected by motor-vehicle transport daily into the atmosphere of our capital. In addition, on sunny days secondary contaminants, photooxidants, pollute the atmosphere.

Work is being done in Moldavia on reduction of the intensity of contamination of the air basin by the exhaust gases of engines. At all enterprises of the Ministry of Motor Transport of the Moldavian SSR technical servicing points have been organized and measures to improve the organization of the transport process are being worked out.

The technical state of motor vehicles in operation plays a considerable role in the contamination of the atmosphere by toxic substances. It is generally known that a motor vehicle not properly tuned contaminates the atmosphere 4-6 times more than one properly tuned. Therefore a need arises for the organization of inspection and adjustment points for the engines of motor vehicles, not only of the Ministry of Motor Transport, but also of all departments, kolkhozes and sovkhozes that have a large number of motor vehicles. At times they go out on the roads of the republic with the power system of the engine not properly tuned.

Such stations are equipped with high-speed gas analyzers and smoke meters, and have experienced workers. If the maximum allowable standard for carbon monoxide content according to test results at an inspection and adjustment point, the necessary adjustments of the carburetor and ignition system are made. If the desired reult is not achieved by the adjustment, the motor vehicle is not allowed to be operated and is directed to the appropriate section or shop for elimination of the malfunction.

Such sections or shops must be equipped with modern means of diagnosis and have workers with high qualifications. Inspection and adjustment stations organized on the basis of movile laboratories and equipped with the necessary instruments can become an effective measure in combatting pollution of the atmosphere. Our industry is issuing instruments for measurement of the smoke content of exhaust gases, models ID-1 or K-408. The foreign

dust meters "Cartridge" and "Bosch EFAW-78" have well recommended themselves, as have Soviet gas analyzers K-457) (State Scientific Research Institute of Motor Vehicle Production), OA-2109, OA-2209 and OA-2309, the SV-7633 titrometric analyzer, etc.

A need also has developed for the creation in the republic of a scientific research laboratory of engine toxicity for the development of an exhaust gas neutralization system. This is dictated, besides all the rest, by the geographic position of the republic and specific features of the operation of motor-vehicle transport under the conditions of specialization and concentration of production characteristic of the region.

For personal automobiles the inspection for toxicity must be carried out in the system of "Moldavian Technical Servicing" at technical service stations, since the engines of personal automobiles, due to unskilled adjustment by their owners are a serious source of pollution of the atmospheres of cities of our republic, especially by lead (due to the use of ethyl gasoline for those engines). When there is improper adjustment or replacement of individual elements of the power system by more productive ones in order to increase the power of the engine the owner of the motor vehicle inflicts on himself and the environment much harm, although he himself may not suspect it.

Lead arriving in the atmosphere with the exhaust gases of inproperly tuned power systems in the form of an aerosol of inorganic salts and oxides detivates proteins, reduces the amount of hemoglobin and destroys blood erythrocytes, has a negative influence on the central nervous system, etc. However, lead is not the principal contaminant of the atmosphere of cities. Carbon monoxide, nitrous oxides, hydrocarbons, aldehydes and other substances emitted in a large quantity with exhaust gases negatively affect the organism of man, plants, buildings and structures.

An efficiently organized technical servicing and maintenance system for motor vehicles will permit not only considerably reducing ejections of harmful substance of engine exhaust gases but also increasing the service life of motor vehicles.

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CONCERN FOR RIVERS NEAR THE BAYKAL-AMUR MAINLINE

Moscow TRUD in Russian 10 Jan 80 p 3

[Article by the TRUD road team: V. Burlakov, fish warden of Glavrybvod [Main Administration for Protection and Reproduction of Fish Reserves and Regulation of Fishing] of the USSR Ministry of Fish Industry, Ye. Logunov, chief of the Tyndinskiy Hydrochemical Laboratory for Regulation of the Use and Preservation of Waters, RSFSR Ministry of Land Reclamation and Water Resources, I. Drushinin, fish warden, M. Ayubov, team-leader of "Glavmosstroy" [Main Administration for Housing and Civil Engineering Construction in Moscow City], deputy of the Tyndinskiy Council of People's Deputies, and M. Poboronchuk, TRUD correspondent at BAM [Baykal-Amur Main Line] construction]

[Text] Some facts about the fall of last year:

We caught a poacher unawares on the Gilyuy, with a net in his hands. For the perpetrator it was something completely unexpected. Such an early hour and suddenly there was the fish warden. In strong nylon nets graylings and lenoks struggled, dark bubbots twisted, and the predawn stillness was broken by desperate splashes of some large redflanked taymens.

"What sort of a trap is this," said S. Suchev, worker of Tindinskiy Road Construction Rayon No 1, with annoyance, as he was caught red-handed. "Ten days ago I netted anything I felt like, and there were no fewer fishes in the river. You would do better to see that fuel oil doesn't fall in the Gilyuy."

We will return again to Suchev's words. I will say now, however, that the morning's fishing cost the poacher a fine of almost 700 rubles. We continued the raid and a few kilometers further on again saw a boat--three poachers were providing themselves with a supply of salmon for the winter. As we watched the perpetrators calmly pulled in nets full of fish, switched on a powerful water-jet engine and sped down over a ridge at a great speed.

"Well, you contend with them," the fish warden sighed. "The rivers are mountainous here, there are numerous ridges, the poachers pass over them

without difficulty in boats with water-jet engines, but ours have only ordinary boat-motors. The poachers penetrate to the banks of the most distant rivers with four-wheel drive vehicles, but in the Tynda inspection area it is not the four-wheel drive vehicle--there is no transport at all. Since 1974 the population of Tynda has become 10 times as large, but the fishing inspection staff has been increased by one man, and now it has two wardens. We also have been hurt materially; thus the game wardens are paid a 70 percent addition to wages, but the fish wardens for some reason obtain only 30 percent.

The rooting out of poaching is only one aspect of the struggle for purity and resources of the BAM rivers. Now is the time to recall the words of S. Suchev about fuel oil.

Practically all the 3500 kilometers of the BAM route pass through river valleys, at times several meters from the water. Economically this is justified on the whole: for thousands of years the rivers have passed through natural corridors in the mountains, and if they are followed there is no need for a large number of tunnels. However, this imposes on the builders a special responsibility to carefully treat the blue resources of the taiga kray. The builders also neglect this completely. These are the facts. To pour the permanent railroad way the mechanizers of the "BAM-stroymekhanizatsiya" [BAM mechanized construction] trust (V. Yevtushenko, manager) and Construction Administration No 95 (headed by V. Nesterov) take gravel from river spits at places designated by the planners. But it became a bad rule that excavator operators, having removed a spit, without being at all embarrassed go out into the river and scoop gravel directly from it. Naturally, dump trucks also go out into the river under the scoops. As a result, for many kilometers down the river stretches a turbid flow of mud and oil products. This occurs especially often in technical columns Nos 43, 94, 116, 141, etc.

As the directives require, upon the completion of work the builders are required to put the quarries in good order. But... we visited on the northern branch of the BAM, at Mogot station. There technical columns Nos. 153 and 154, Tyndinskiy Road Construction Rayon No 1, the Mechanization Administration and the motor vehicle base of the "BAM stroyput'" [BAM construction route] administration have taken gravel on a single river. And they left behind, excuse the expression, the present pig-wallow. Here and there are mounds of gravel, heaps of abandoned, greasy metal scrap, and between them pits of water, on the surface of which floats a greasy layer of fuel oil. The rains carry that contamination into the Mogot all the time, then into the Gilyuy, from the Gilyuy into the Zeya, from the Zeya into the Amur... The same or a similar picture exists on many taiga rivers where powerful technology has triumphantly prevailed. Appealing to the managers of the USSR Ministry of Motor Transport and its GlavBAMstroy [BAM construction headquarters], we state with all responsibility: quarries along the route have not been restored to their original state by the builders in the complete sense of that work.

On the central section of the BAM there are more than 100 motor vehicle bases and technical columns and administrations of mechanization and

mechanized parts, but only one enterprise, the motor transport base of the "BAMstroyput'" administration, has an area for washing transport where settling tanks have been built and a circulating water supply system is functioning. At the rest of the enterprises the muddy flows enter the brooks almost without hindrance, and then the rivers. In the cities and settlements of the BAM there are not only no storm drains, but none are planned. Tynda ought to be a model of that, but no one either in the construction administration nor in GlavBAMstroy has thought of that yet. I would rather not speak of the dumps, but circumstances make it necessary. Now all the refuse is transported from the city of Tynda and dumped directly at the banks of a brook. It has no name, but that spring could be called black--impurities from that place float across the country into the Tynda brook. The first timber procurement establishments--Belen'kiy, Tyndinskiy, etc--have appeared on the route and they also have begun to make their contribution to the contamination of rivers.

Often the troubles of rivers start with poor plans. Thus, the Moscow State Planning and Surveying Institute of the State Industrial Committee for Transportation Construction USSR issued documentation for the construction of purification structures for four stations of the BAM-Tynda lines without properly studying the geology of local soils and taking into consideration the influence of permafrost. The Management of BAM construction, without having coordinated their plans with the workers of the water preservation service, allowed (without having the right to do that) the builders to start work. The result was that the purification structures at the Murtygit station were destroyed. Now at Murtygit cubic meters of wastes are discharged into the Malyy Ol'doy river without the slightest justification. And how are things at other stations? Only at Belen'ka is purification carried out according to all the requirements, but at the BAM and Anosovskiy settlements the purification structures constructed with deviations from existing standards are not fulfilling their functions. All the fault for this outrage lies completely with the management of main line construction that operates the Tynda-BAM line.

By the end of last year the Tynda-Verkakit line had gone into operation. The plan for transfer of that complex until recently included a point on the entry of large purification structures into operation at Tynda. The builders have done almost all the work on them, are finishing them. But not long ago, completely unexpectedly the management of BAM construction through its chief, V. Kalinichev, informed the builders about a delay in the acceptance of their purification structures for an indefinite time. What could have caused such a strange decision of the department that is always fighting with hot words for the protection of nature? It turns out that the management did not order equipment for the purification structures in time. Orders for much of the equipment have just been placed at enterprises of the country. As a result, cubic meters of turbid water are being poured into the wretched Tynda river.

A strange "absent-mindedness" is found everywhere among the builders, when along with industrial and residential objects it is necessary to erect

purification structures. For example, last year many thousands of rubles were allocated for the construction of purification structures at Kuvykta and Horogocha to SMP [stroitel'no-montazhnyy poyezd--construction and installation train] No 574 of the "Tyndatransstroy" trust and the SMP of "TulaBAMstroy" at Mareva. However, the builders have not yet expended a single ruble on those objects. I would like to hear from the management of GlavBAMstroy how they themselves regard such a situation.

Several desires for hydrologists, designers and collectives of industrial enterprises manufacturing construction equipment. The time has arrived to carry out thorough scientific investigations of the influence of man on physical properties or chemical composition of water, to study the hydrological regimes of BAM rivers and to issue necessary recommendations to the builders. It evidently is time for designers to think about creating mobile field fuel and lubricant storage buildings equipped with devices to protect against fire and preserve nature.

It is time to take the protection of BAM rivers against contamination seriously and thoroughly. If it is taken into consideration that nature is readily injured, special more rigid legislative measures are needed for its preservation, and a special "purity-density" technology. We understand that all this will not be done in a day. But man, willy-nilly, still is the first and main culprit in the damage of nature. It is necessary to inculcate in the builders a respectful and careful attitude toward pure rivers.

2174
CSO: 5000

MINISTER, ATTORNEY GENERAL WEIGH ENVIRONMENT LAW'S IMPACT

Copenhagen BERLINGSKE AFTEN in Danish 11 Jan 80 p 3

[Article by Kirsten Mikkelsen]

> [Excerpt] Although pollution control is not supposed to occur in the courts some cases end up there anyway, leading to small fines, much too small in the opinion of the environmental minister and the attorney general who are now trying to do something about it.
>
> We spend about 3 billion kroner a year on environmental protection, with great efforts being made to insure clean air, less noise and less polluted waterways. The Environmental Board has assessed the 5 years since the environmental protection law was passed.

What is meant by a good environment and improved quality of life? What does it mean if the air becomes cleaner, noise diminishes and streams become less polluted and what are these things worth? The price we pay in this country is about 3 billion kroner a year, roughly 1 percent of our gross national product. But the courts do not yet value the environmental protection law so highly that we can say it doesn't pay for a firm to pollute. Often it does.

After 5 years with the environmental protection law which has demonstrably improved the Danish environment both the environmental minister and the attorney general consider the fine levels much too low.

At the request of Environmental Minister Ivar Norgaard Attorney General Per Lindegaard has asked public prosecutors and chiefs of police to step up their efforts in this area.

The Environmental Board recently backed up this request in a letter to municipal councils, county councils and the capital's urban council, asking their help in raising the fine levels. This can happen in cases

of water pollution caused by a pile containing liquid manure or silage, for example, where the fine limits are from 1000 to 2000 kroner. Other cases can involve firms that do not live up to pollution control requirements imposed on them and still others can involve polluting businesses that have started up illegally. This applies even if no real environmental damage has occurred.

The fines are supposed to have a preventive effect. The fine limits must be in a range that has some effect and in order to prevent firms from simply adding possible fines into the operating costs of doing business consideration must be given not only to the nature and severity of the offense but to the economic advantages achieved or sought by breaking the law. Evidence must now be gathered by municipalities and counties supervising the law. In the past the police--the rural constabulary--took care of these matters.

Judgments

The Environmental Board has found that pollution control measures add up to an average of 4 percent of industrial investments while annual spending on environmental protection is less than a quarter of 1 percent of sales. Even though the percentage can go as high as 10 percent in some branches and for some individual firms a recently issued report on the effects of environmental reforms says that in general environmental protection has not been much of a burden on Danish industry.

Although it is not the intention that pollution control should occur through the courts half a hundred cases end up there each year when restrictions and regulations are not respected.

As an example of the kind of thing the Environmental Board is concerned with office manager Ole Jacobsen told us that Superfos in Fredericia did not abide by the rules when it started a building project before it received the approval of the authorities. The firm was fined 10,000 kroner. The Environmental Board appealed the verdict and asked for a fine of 100,000 kroner but the appeals court upheld the judgment.

Another example of an apparent tendency of the courts to view tax and duty violations more seriously than violations of the environmental law is a typical case of pollution from a dump on agricultural property where the authorities asked for a fine of 10,000 kroner which the court reduced to 5000.

In a case from Arhus, Nordisk Tekstiltryk, Inc. was fined on 23 November for having failed to provide better filtering facilities for its waste water. In 1976 the firm had to pay the town 80,000 kroner in compensation for having damaged the town's filtering system.

In 1979 the case had still not been resolved satisfactorily. The prosecuting authorities charged that a sum of around 35,000 kroner that the firm had saved in this way should be confiscated and an additional fine of 30,000 kroner was requested.

The firm was fined 5000 kroner. The prosecuting authorities then appealed the case to a higher court.

Environmental Requirements

After 5 years of experience with the environmental protection law it is known that very few cases end up in court. Most of the nation's companies follow the regulations they are given.

When it is estimated that total annual expenditures in the environmental protection sector are around 3 billion kroner it is because the traditional functions such as sewage disposal and trash removal are included, adding up to about half the total amount. The other half goes to filtering systems and represents an extra cost due to direct environmental requirements. Of this 1.5 billion kroner 200 million goes for administration on the Environmental Board and in the counties and municipalities.

We have talked with office manager and chief engineer Mogens Bundgaard-Nielsen and Morten Biilmann about the Environmental Board's balance sheet on the effects of the environmental law. They feel we have received something of value for the sums of money spent but pointed out that it takes time to make people aware of the fact that a better environment is worth a lot of money. The law has been on the books for 5 years but it is only now that something is happening around the country--and there are still big differences from one municipality to the next.

Air

The air quality has improved, especially over the capital where the sulfur dioxide content of the air has declined a good 50 percent and the soot content has declined 80 percent, especially due to the expansion of remote heating plants, the raising of chimney heights and the limited sulfur content of oil.

A decline in the lead content of the air from 900 to around 700 tons a year was noted after limits on lead in gasoline were reduced. The Environmental Board has recommended a further reduction in the lead content of gasoline which would bring the lead content of the air down to around 300 tons.

Water

Water quality is satisfactory but they recommend closer inspection of the quality of drinking water and detailed studies of conditions that might lead to a risk of ground water pollution.

"If we don't take care of the ground water we could end up in a situation where it would have to be filtered and that would make drinking water three or four times as expensive as it is today," said Mogens Bundgaard-Nielsen and Morten Biilmann. "It doesn't help to build expensive waste water treatment plants if at the same time one is reclaiming the ground water so that the streams dry up." That is why they are considering economic controls, such as water taxes, as a means to prevent pollution.

Although there has been a substantial improvement in purifying the waste water discharged into streams, lakes and harbor areas there has been no marked improvement of water quality because other factors are important, including the way in which water is maintained. An effort is being made to change the environmental quality of our lakes but the effects of steps taken now will not be felt for many years. In some fjords and in coastal stretches unsatisfactory conditions have been detected with a superabundance of algae and limited opportunities for fish to develop.

But water used for swimming purposes has improved substantially in several locations.

Soil

Several studies should be started to investigate how pollution of the soil affects animal and plant life in the view of the Environmental Board. As a result of developments in agriculture in the last 10-15 years fertilizer applications have increased and it is feared that when the fields lie fallow in winter the excess fertilizer will seep down into the ground water and out into the streams.

To avoid this it may be necessary to sow the fields after each harvest to absorb the rest of the fertilizer in such crops as grass.

Noise

Noise is a problem child in the area of pollution control. It has been possible to take steps against noise from industries, airports and air bases but nothing has been done about traffic noise. Almost half of the homes in the nation are exposed to unsatisfactory, often unacceptable noise levels. The main cause is highway traffic, especially noise from trucks and buses which make up 5 percent of all vehicles but create half the total noise.

A new EC directive aimed at cutting street and highway noise in half within a few years is being discussed at the moment but since new rules on less noisy cars would apply only to new cars it will take a dozen years or so before there is a noticeable reduction in noise pollution.

The Environmental Board also feels there is a need for more detailed guidelines on noise control for use in planning and building new roads, railroads and houses.

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WEST BERLIN AIR WORSENED BY POLLUTION FROM EAST EUROPE

West Berlin DER TAGESSPIEGEL in German 22 Jan 80 p 10

[Article: "Berlin Gets Bad Air From the East--Political Consequences Drawn From Air Pollution Map"]

[Text] In comparison with large European cities, Berlin's air does not get a high rating. Some 10 to 20 percent of the average annual pollution in sulfur dioxide comes from the industrial surroundings of the city. Southeast of Berlin--in the GDR, in Czechoslovakia, and in southern Poland--the highest level of industrial air pollution in Europe was observed. When the wind blows from the east and southeast, these gases head for this populated region which is already polluted enough; extremely high concentrations of toxic substances are the result. Analysis at the Otto Suhr Institute of the Free University in Berlin have started a "political and environmental research project."

The basic documentation on air pollution in Europe was developed at the Norwegian Institute for Air Research (Oslo) in 1973 and 1974. Ten scientists derived their demands for political consequences from this documentation. "In view of these facts, environmental protection in this city is inadequate when compared with other Western nations," stated an opinion paper by the group. Fewer efforts are made here than in other Federal Laender. They went on to say that the people of the city are also affected differently by this inadequacy in environmental protection. The geography of differing types of air pollution conforms to the distribution of heart and circulatory illnesses and of lung diseases.

More Pedestrian Malls Proposed

Among the "drastic environmental protection measures" demanded by the scientists is included a limitation on automobile traffic; this would, however, not lead to a reduction of sulfur dioxide but rather to less carbon monoxide in the air. In order to realize this the authors demanded a "systematic reduction in the number of kilometers driven by automobiles, at least in the central city." Expanded pedestrian malls, a reduction in traffic, expensive parking spots, as well as the demand for public transportation were proposed for improving the environment.

Technical innovations in the area of energy are also demanded. Berlin's location offers the unique opportunity for searching for long-term solutions to energy problems and for testing the systematic use of conservation technologies. In the opinion of the scientific group, a simultaneous promotion of new production methods and economic branches which conserve material and energy should also be attempted, because this method would be cheaper than subsequent environmental protection for "waste disposal." Because this primarily involves a reduction in the flow of toxic materials from the GDR, the scientists called for "technological assistance to heavy industries surrounding West Berlin." They would be "more meaningful than FRG aid for the construction of autobahns in the GDR."

0.015 mg SO_2 Come From Other Areas

An annual mean for Berlin of 0.015 milligrams of sulfur dioxide per cubic meter of air is presently calculated as the basic cause of pollution from faraway European sources. The European Community already had a study performed in 1976 on the toxic gas pollution in various large cities. At that time, six measurement sites in Berlin registered a mean of 0.101 milligrams. In Milan, air pollution measurements arrived at a figure of 0.263 mg and in Copenhagen means of between 0.024 and 0.051 mg of sulfur dioxide per cubic meters of air. Data on London, Manchester, and Paris could not be included in the comparison because the acid content in the air was measured there. The Norwegians, however, based their study on deposits in dry form--that is on sulfur dioxide dust. The scientists in Berlin used this data for their evaluation.

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POLLUTION KILLING FISH AT INCREASING RATE IN NORTH SEA OFF FRG

Frankfurt/Main FRANKFURTER ALLGEMEINE in German 14 Jan 80 p 7

[Article: "More and More Diseased Fish in the North Sea"]

[Text] Hamburg, 13 January. Symptoms of disease which are appearing at an increasing rate in the North Sea, especially in the German Bay, in all types of fish are causing scientists of the Federal Research Office for Fisheries (Hamburg) to worry. It has not been excluded, and as a matter of fact is considered probable, that acids from northwest of Heligoland as well as the deposition of sewage sludge from Hamburg at the mouth of the Elbe River are causing these abnormalities in numerous fish.

Twelve diseases which would not appear under normal circumstances have been ascertained in edible fish, mainly in plaice, sole, flounder, turbot, and cod. These diseases usually involve surface skin pustules, fin rotting, bronchial tumors, deformation of the spine, and hampered growth. Some 2 to 5 percent of the fish caught were diseased but in individual cases up to 10 percent were diseased. In the areas of the North Sea close to shore, said Prof Klaus Tiews, the director of the Federal Research Office, the number of diseased fish is largest of all. But even in the distant Dogger Bank there are alarming numbers of harmed animals.

Recently, the research ship "Anton Dohrn" cast its nets for for the first time in winter in the area around Heligoland in order to track down the changes which could be caused by sewage sludge and acids. The animals are to be investigated carefully for bacteria and other viruses, for changes in blood composition, and for residues of heavy metals.

Deconcentrated acids coming into the North Sea waters about 20 km off the shores of Heligoland result from the production of titanium dioxide, a dye which is used, for example, to make toothpaste white or to starch shirts; in unconcentrated form, these acids are transported out to the North Sea from Nordenham. The Hamburg scientists now suspect that the flow of chemicals has increased the iron content of the water in that area of the sea to such an extent that the animals are subject to "stress" because they cannot cope with the changed composition of the water which the fish

absorb through their gills. Tiew said: "It is similar to a situation where human beings have to breathe constantly in a smoke-filled room." The sewage sludge from Hamburg, which is dumped at the mouth of the Elbe River--by permit of course--probably leads to a reduction in the oxygen in the sea.

The complicated system of water mixtures in the German Bay, which is added to by storms, currents, the tide, and the water from the Elbe, which in turn is a cause for the increase in pollution in this part of the North Sea, do not permit any definitive conclusions about the reasons for the diseases, according to Tiew. But it has been proven that many species of animals, such as mussels and worms, have disappeared from the sea floor in the the areas in question which means a reduction in the food cycle for this fish. It can already be seen that over the long run these underwater "garbage dumps" cannot be tolerated. The ecological system in the already limited fishing zones for the German fishing fleet is facing a grave danger. There are no alternatives.

The Federal Research Office, Professor Tiew added, no longer sees itself in the position of giving the green light for any more such deposits in the North Sea. The communities involved--above all Hamburg, naturally--will have to consider other possibilities for disposing sewage sludge: "Berlin or Dortmund also take their garbage to land-based depots."

Tiews stressed that he does not want to play the game of environmentalism at any cost; the sea's capacity should be exhausted as much as possible. But when the limit is reached, then the continued disposal of waste products into the waters can no longer be allowed. Otherwise the same could happen as off the coast of New York where a year and a half ago the sea tipped biologically up to 70 miles off the coast: millions of fish died because of a lack of oxygen. The loss to the fishing industry was estimated at 50 million dollars. The sewage sludge from New York was considered the cause for these deaths. In New York the sludge has been dumped into the sea for more than a decade.

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CSO: 5000

WERRA RIVER POLLUTED BY CHEMICALS FROM GDR

Duesseldorf HANDELSBLATT in German 28/29 Dec 79 p 3

[Article by Joerg-H. Beyer: "The Werra River Brings in 35,000 Tons of GDR Salt a Day"]

[Text] Eschwege. The salt brought in from the GDR by the Werra in great quantities saddens nature buffs, angers environmental protectionists and is increasingly worrying politicians. Recent tests have shown that this small, romantic river daily transports 35,000 tons of salt across the German-German border and that it exerts a negative influence upon the entire biosystem on the riverbanks and in the water.

For some years now the results of this have been registered, analyzed and deplored. Nothing has changed the situation to date. The Werra's and Weser's self-purification capabilities have been destroyed on some stretches; the water's capacity for oxygen absorption has been reduced; fauna and flora in the rivers and on the banks are visibly impaired by the salt load. Fish, insofar as they have been able to adapt to these unnatural conditions, suffer from pathological growths and deformations; communities, among them the big city of Brehen, can use the salty water for drinking water only by combining it with large quantities of water from other sources.

"We have tried for many years to enter into a discussion with the GDR about this problem," says Parliamentary State Secretary of the German Ministry of the Interior, Dr Heinz Kreutzmann, who has waged a continuous battle for contractual agreements with East Berlin on the subject of salt pollution. "Since 1913, salt quotas had been agreed upon between the Thuringian potash area near Merkers, Unterbreizbach and Dorndorf as well as with the Hesse area near Heringen, Hattorf and Philippsthal (Kreis Hersfeld-Rotenburg). For practical purposes, these quotas were adhered to until 1951."

After the war, these quotas were determined for the last time in 1947 with the participation of industry representatives from the Soviet occupation zone. They were 61.89 percent for the potash works in Thuringia and 38.11 percent for those in Hesse. Representatives of the newly founded GDR participated in the negotiations for the last time in 1951; but the quotas were adhered to nevertheless.

The disastrous change occurred in 1968. Since that time, the GDR has been dumping all potash water into the Werra without any purification. The water chloride content jumped dramatically at that time from 2,500 mg per liter to 40,000 mg, an 18-fold increase.

The Hesse works have disposed of the salt water residue from manufacturing Kieserit, a basic component of chemical fertilizer, by draining it into cistern wells (subterranean caverns). More recently, they have been increasingly using electrostatic separation by drying, which produces relatively small quantities of highly concentrated brine, which is then drained into subterranean dolomite layers. The GDR is not using this sophisticated and very expensive process.

State Secretary Dr Kreutzmann hopes that this salty problem will once again be dealt with during the next meeting between State Secretary Gaus and the GDR minister of foreign affairs. In the FRG a project has surfaced in the meantime, dealing with a pipeline leading from the Werra to the North Sea which, considering a length of 388 km and the necessary pumping stations, has an estimated cost of DM 1 billion. Annual maintenance costs are expected to be DM 10 million and the system's life expectancy 20 years. Other possibilities include a system conversion of the GDR factories or a reduction in their production of Kieserit, to be compensated for by shipments of that product from the FRG.

9273
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LEGISLATIVE BACKGROUND ON ENVIRONMENTAL POLLUTION PUBLISHED

Athens BUSINESS & FINANCE in English 12 Jan 80 pp 20-25

[Text]

THERE are in practice relatively few laws and decrees covering the field of environmental pollution in Greece and it has largely been since 1976, when the government first started looking seriously at pollution problems in the country and how to go about solving them, that the stricter implementation of existing laws and the introduction of new measures has had a positive effect on the environmental protection equipment market.

In fact the first form of environmental legislation in Greece was introduced as long ago as 1965 when Decree number 225 (of 22nd January) laid down some basic guide lines affecting industries with waste-water disposal systems feeding either into the sea or into rivers and other domestic waterways. For the purpose of implementing the Decree all such areas were separated (by decision of each local authority) into five classifications depending on their use. These five were: water supply, swimming, fishing, shell-fish harvesting and other uses. In fact the specifications mentioned in the Decree could be added to at the discretion of each local authority and many introduced other specifications to suit the particular industries associated, with their areas and to complement the Decree's provisions.

Varied specifications

The result was a variety of specifications covering waste water disposal by industry, depending on its location, which referred both to the chemical and physical properties of the disposed liquids and to the same properties of the recipient water-course after disposal had been accomplished. In fact the provisions of the Decree itself merely established limits as to the content of certain elements in the water-course used for disposal after the industrial effluent has been added. An addendum to the Decree also covers the disposal of liquid wastes on land areas. Provisions in the Decree allow for a license to operate an industrial unit (or expand existing installations) to be issued on a 6 month temporary basis once the local authorities are satisfied that adequate pollution control measures have been designed into the new project so that effluent levels comply with the Decree. If after the first six months of operation it has been shown that the pollution control equipment adequately meets requirements, then a permanent license is issued for the project to continue.

Table 1 gives an indication of the more important specifications contained in the Decree from which it can be seen that the original provisions were of a very general nature. More specific and wide-ranging limits were introduced for each specific local area and the most important of these naturally effect the areas of Athens and Thessaloniki where restrictions have been placed on the levels of certain elements, solids, and other noxious matter which can be discharged in effluents into the sewage system or streams. By far the most stringent restrictions apply for the Athens area and maximum concentrations permissible (as provided for under Decree 656 of 2nd July, 1979) are as follows (in milligrams per litre unless otherwise indicated):

Pollutant	Into sewage system	Into streams
pH	6 to 9	6 to 9
Temp (^{0}C)	35	28
Dissolved O_2	–	3
BOD*	500	40
COD	1,000	120
Suspended solids†	500	50
Dissolved solids	3,000	1,000
Detergents	50	50
Fats/oils	40	5
Lubricants	15	1
Ammonium salts (mg N/l)	25	10
Nitrous salts (mg N/l)	4	1
Nitrate salts (mg N/l)	20	4
Phosphates (mg P/l)	10	0.2
SO_2	0	0
Sulphurous salts (mg SO_3/l)	1	0.2
Sulphates (mg SO_4/l)	1	0.2
Hydrogen sulphide	1	0.1
Al	10	1
Sb	5	6.5
As	0.5	0.1
Ba	20	2
Be	30	3
B	10	2
Br	10	1
Cd	0.5	0.05
Cr (3+)	2	1
Cr (6+)	0.5	0.2
Co	10	2
Cu	1	0.2
Cyanides	3	0.1
F	20	2
Fe	15	2
Pb	5	0.5
Mn	10	1
Hg	0.01	0.01
Mo	10	2
Ni	10	0.5
Phenols	5	0.5
Se	0.2	0.02
Ag	5	0.5
Tl	?	0.2
Sn	10	1
Ti	10	2
U	5	1
Zn	20	0.5
Free Cl_2	5	0.4
Dangerous bacteria	–	200

* Biological oxygen demand

† Particle size less than 1.5 cm in sewage system

Also included in the restrictions are total bans on effluents containing any inflammable substances, carbon disulphide, trichloro-ethylene, radio-active materials and sludge from waste-water treatment plants.

The concentration limits applicable to effluents in the Thessaloniki area are fewer and arise from a 1973 regional decision. The maximum limits (again in milligrams per litre of effluent) are general for disposal in sewers and streams and are as follows:

Pollutant	Concentration
pH	6.5 to 8.5
BOD	30
Suspended solids	50
Phenols	0.5
Hydrocarbons	10
Pb	5
Cr (6+)	3
Hg	0.05
Fe	30

The new law

By far the most significant legislative step in the pollution field, however, was taken earlier this year when the new law entitled "Protection of the environment and of workers from pollution" was first presented to Parliament. The main contents and objectives of the draft law were published in B&F issue No. 38 and though the law itself has not been ratified by Parliament, it is to be expected that no major amendments will be introduced. The workings of the new legislation (which will be backed by Ministerial Decrees from the Ministries of Industry and Labour) will be based on the classification of industrial units into three categories (high, medium and low) according to the degree of pollution associated with each unit. This categorisation will be the responsibility of each local authority at whose discretion further specifications, apart from those contained in the new law, may be applied.

To recap briefly on the effects of the new law, it is proposed that one year following its enactment there will be established:

1) A list of elements and other agents considered as polluting agents

2) The specification of emission standards, and specifically

- the waste per final product unit
- the total waste per time unit
- the concentration of polluting agents in effluents

3) Standards and technical rules of operation for each industry (waste disposal and recycling requirements included).

Environmental license

Under the proposed provisions of the new law, any new industry with high or medium disturbance installations must first be provided with an Environmental License. The application for this first license must include an Environmental Impact Study and the granting of the Environmental License will imply that operation of the unit complies with standards of emission, and may include additional terms of protection.

Existing industries must be provided with a Provisional License which will be issued after a Statement of Environmental Impact of their operations. If needed, they must apply urgent or gradual environmental protection measures and in 5 years' time, at the most, they must all have adapted to the new specifications and have a permanent Environmental License. The 5 year deadline set for a plant's meeting the new specifications applies to high pollution units, whereas for units classified as causing medium levels of pollution, the environmental protection equipment must be installed within four years.

If disturbance is caused by a low disturbance industry, then the competent government agency is able (though not obliged) to set conditions of operation on these industries as well.

Labour protection

Presidential decrees will define, by branches of economic activity or more generally, the following:

a) Exposure limits (e.g. maximum value, marginal value).

b) Substances absolutely prohibitive for direct exposure.

c) Methods and procedures of sampling and measuring.

Table 1: Maximum permissible limits for polluting agents in water after effluent disposal (specifications provided for under Decree 225 of 1965)

Polluting agent	Fresh water			Sea water			
	for water supply	for recreation	for fishing	for recreation	for fishing	for shell fish cultivation	for other uses
Dangerous bacteria (max)	50/100ml	500/100ml		500/100ml		70/100ml	
Phenol compounds (as phenol-max)	0.005 mg/l						
pH value	6.5 to 8.5	6.5 to 8.5	6.5 to 8.5				
Dissolved O2 (min)	5mg/l	5mg/l	5mg/l	5mg/l	5mg/l	5mg/l	3mg/l

Other specifications cover general substances including suspended solids (which are either permitted up to levels where the solids are not visible or, for certain uses, are not permitted at all); toxic substances (not permitted at all); and other dangerous oily or coloured substances.

Health inspection by government agencies will include:

a) Quantity and kind of certain dangerous substances in blood, urine, breath, skin tissues, etc.

b) Permissible limits of change of certain enzymes and natural organic functions.

The standards are to be set by the Ministries of Labour and Social Welfare. Noise, vibration, and radiation are included in the areas of control. The government can require, according to the case, proof of compliance with health requirements.

Special protection can be established for certain areas of tourist, archeological or natural resources interest, and also for areas that can be determined as environmentally congested. No installations can be effected in these two types of areas, irrespective of level of disturbance.

Each company is responsible for taking all necessary measures in cases of emergency or accident. The company can also keep a record of measurements (taken by its own control equipment) which would replace the periodical control by special government staff. Government control would thus be limited to verifying the records.

Inspection and fines

Violation of the environmental law, checked by staff of the respective Ministry, will be followed by administrative penalties, irrespective of any criminal penalties, of 15 to 800 thousand drachmas and the temporary or permanent recall of operation licenses. Besides the actual individual responsible for violating the law, also held responsible will be the higher executive members of the company (e.g. the Managing Director of a corporation, etc.). The responsibility will in fact lie solely with the company – not with the party which carries out the Environmental Impact Study (submitted with the application for Environmental License of operation), neither with the party responsible for the installation of pollution control equipment (the civil or chemical engineer, etc.).

High growth rates

The market for pollution control equipment in Greece has grown rapidly in the last few years, largely as a result of the stricter implementation of environmental protection legislation. Though the growth rates have been higher, however, the overall size of the market is still relatively small. An approximate figure of between $10 and $15 million has been suggested as a rough guide to the size of the market for air and water pollution control equipment in Greece, but establishing a realistic level for such a market is difficult since some 80 percent of requirements are imported (West Germany is probably the largest single supplier) and the types of equipment involved are normally only classified under the general customs heading of machinery and equipment.

The private sector has in the past, and will probably continue to be, the major market area for pollution control equipment, with the State largely only buying such equipment for use in power stations. An indication of the levels of pollution associated with specific industries can be obtained from table 2, prepared by the Hygiene Department of the Ministry of Social Services, which shows the volumes and masses of various industrial wastes which are discharged into both the sea and the sewage system in the Athens region.

Looking at specific sectors mentioned in the table, it should first be noted that in all cases growth rates as measured by the installation of new pollution control equipment will be

Table 2: Industrial effluent issuing into sewer system and sea in the greater Athens area

	Number of units	Discharging into the sewer system				Discharging into the sea*			
		WV m^3/d	BOD^5 kg/d	SS kg/d	TDS kg/d	WV m^3/d	BOD^5 kg/d	SS kg/d	TDS kg/d
Food	68	14,363	6,447	9,166	37,202	2,110	767	1,032	4,657
Beverages	13	5,846	3,412	3,063	9,835	6,250	6,779	14,647	9,783
Textiles	136	37,602	22,184	8,053	69,630	—	—	—	—
Linen	6	5	1	—	13	—	—	—	—
Furniture	2	500	—	121	1,767	—	—	—	—
Paper and board	6	7,258	2,058	3,143	11,843	1,474	620	1,863	6,795
Tanning	68	2,148	2,064	3,117	11,512	—	—	—	—
Plastic, rubber	18	127	2	3	150	—	—	—	—
Chemicals	86	14,367	1,601	6,667	73,186	121,337	1,134	**701,168	1,737
Oil and coal	11	1,667	238	154	3,673	128,400	1,305	2,235	31,719
Non-metallic minerals	15	45	—	212	125	650	9	6	481
Basic metallurgy	11	550	15	1,324	18,917	406,000	1,226	177,316	—
Metal products	60	2,230	24	1,728	1,561	—	—	—	—
Machinery	39	1,386	296	177	2,031	—	—	—	—
Shipbuilding	6	14	1	1	5	—	—	—	—
Others	7	43	7	38	106	—	—	—	—
Power	2	700	980	546	2,730	1,150	—	87	532
Laundry	16	525	61	72	1,550	—	—	—	—
TOTAL	**540**	**39,446**	**40,391**	**37,855**	**245,836**	**667,371**	**20,900**	**898,354**	**55,689**

Source: Hygiene Department at the Ministry of Social Services

WV: Waste volume
SS: Suspended solids
m3/d: m3 per day
BOD: Biological 0^2 demand
TDS: Total dissolved solids
Kg/d: kg per day

* Excluding cooling water

** Virtually all represented by gypsum from the Drapetsona fertiliser plant.

A further major market in the public sector which will materialise in the coming few years will be related to the establishing of domestic waste water treatment facilties, particularly in the regions of Athens and Thessaloniki, over the next five to ten years. It is the case throughout Greece at present that very little, if any, treatment is carried out on domestic waste water effluent and, perhaps more importantly, no treating of either domestic or industrial waste water in the Athens area (apart from a rudimentary screening) which flows through the sewer system out to sea at a rate of around 360,000 cubic meters a day.

Technical studies

Though much preparatory work has been done in the way of technical studies on the problems of waste water disposal in the Attica area (the most important preliminary work having been the Master Plan designed by the UK firm of Watson Consulting Engineers which was completed in 1978), no final study has yet been made and it may well be some years before the market in this area opens up. When it does so, however, it will prove one of the most significant areas in the pollution control equipment sector since it is not only Athens where such equipment will be required in the coming years, but also Thessaloniki, Patras, Larissa, Ioannina and other centres where existing treatment facilities are equally inadequate.

high since, not only is such equipment required for the opening of new installations, but existing plants must also act to meet the stricter environmental legislation.

ATE requirements

In the food sector, the Agricultural Bank of Greece is the major buyer of equipment with the canning and dairy industries the most active at present. In chemicals, all of Greece's major fertiliser companies have been major buyers of equipment in the past, for both air and water pollution control. Two of them, Phosphoric Fertilisers and Chemical Industries of Northern Greece, have recently purchased equipment as part of production expansion programmes, while the other two majors, Hellenic Chemical Products and Fertilisers and Aeval, are also planning on new pollution control equipment – the latter having tendered for such equipment only recently. Such planned projects as the petro-chemical complex to be established at Krioneri (by the State owned Greek Industrial and Mining Investment Company – HIMIC) and the new ammonia unit proposed near Kavala in northern Greece will also involve major purchases of pollution control equipment.

Metallurgical pollution

The mining, metallurgical and associated industries have also in the past provided a good share of the market for pollution control equipment in Greece and expansions and new projects in the next few years, if they all materialise, will certainly represent important new markets.

For example the establishing of an asbestos mine and plant near Kozani (again by HIMIC), work on which has already begun, will be associated with significant requirements of fabric filters which have also found steady markets in the cement industry. In fact the larger metallurgical units in Greece (probably the two most important are Aluminium de Grece and Larco) have already installed a good degree of pollution control equipment and though in the past they represented a large sector of the total Greek market, the future will depend on how quickly new metallurgical projects materialise. Of these new projects the two major ones will be the proposed new alumina plant for Greece (to be established with Russian know-how) and HIMIC's planned 30,000 tons a year ferro-chrome plant, which seems only now to be getting off the ground. Greece's five steel mills will probably also invest in pollution control equipment in several areas in the near future to meet environmental regulations.

Within the area of Athens alone, the large number of textile companies and the fact that many of them currently do not possess adequate waste water treatment equipment would make this sector important also. Particularly in the dying, finishing and synthetics areas the call for equipment in the next few years will probably be significant.

Power production

The sector of power production has been a major market in the past (particularly for electrostatic precipitators for installation at lignite based power plants) and though all existing plants are now fully equipped in this sector, the Public Power Corporation's plans to increase the country's electric power generation capacity by over 22 million kwh to 40 million by 1987 will necessitate the bringing on stream of several new lignite based stations in the coming years

Naturally these will be associated with regular calls for precipitators to meet anti-pollution legislation.

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